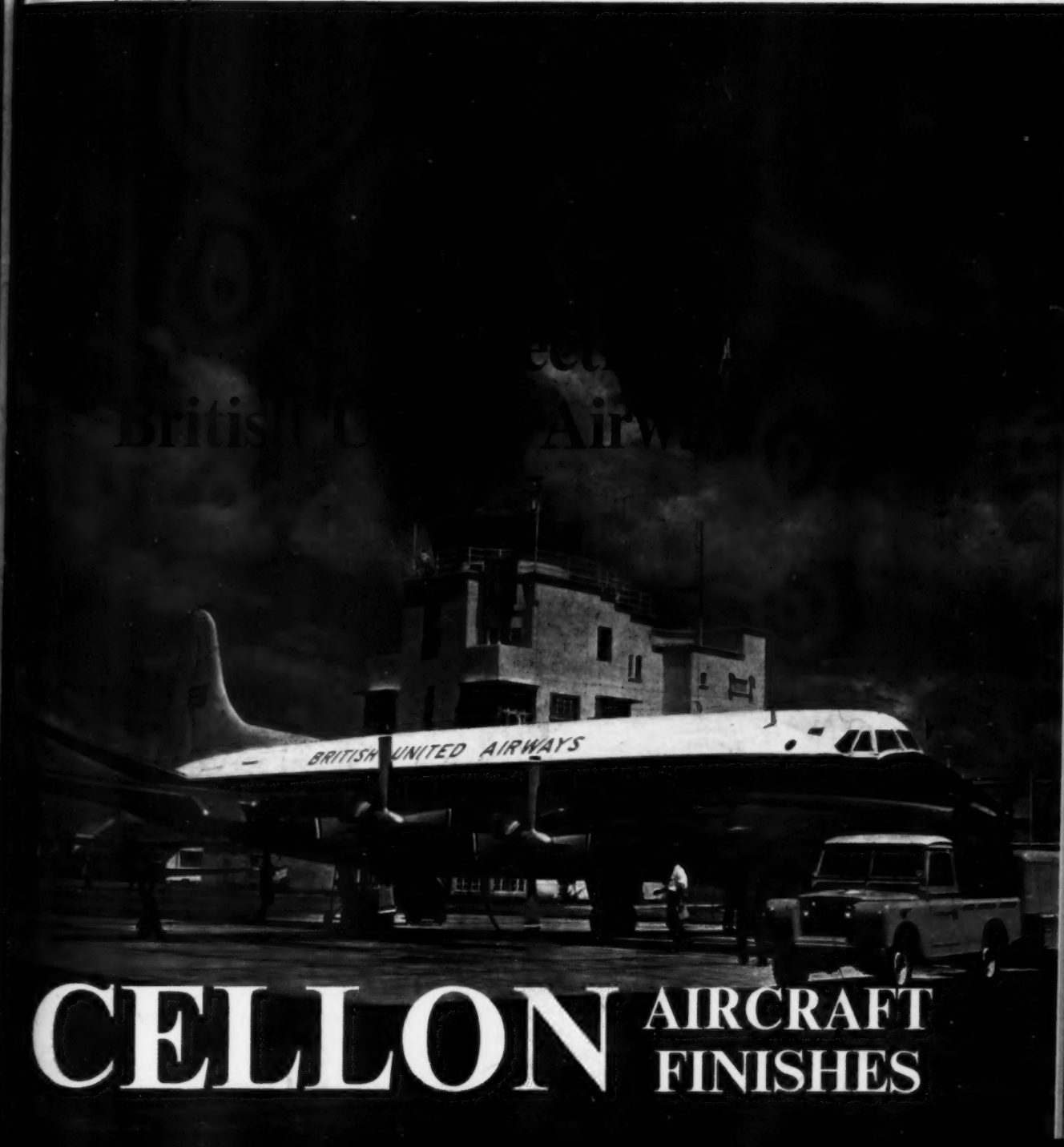
2 OCTOBER 1961 ONE SHILLING & SIXPENCE

FLIGHT

Eng - Dept



CELLON AIRCRAFT FINISHES

FERRANTI

ELECTRONIC & GYROSCOPIC EQUIPMENTS

Ferranti are able to offer a wide range of Gyroscopic and Transistorised equipments for all types of aircraft. The main features of these equipments are their high reliability and efficiency, coupled with light-weight and small space demands. Many units are hermetically sealed.

All Ferranti equipments are fully supported by a world-wide technical service organisation and conform to British Civil Air Requirements (B.C.A.R.).

★ Artificial Horizons in $4\frac{1}{2}$" and $3\frac{1}{4}$" cases.
★ Horizon Gyros.
★ Vertical Signalling Gyros.
★ Helicopter Flight Instrument Systems.
★ Inertial Navigation Systems.
★ Transformer Rectifier Units.
★ Transistorised Static Inverters, Converters and Voltage Regulators.
★ Vocal Audio Warning System.

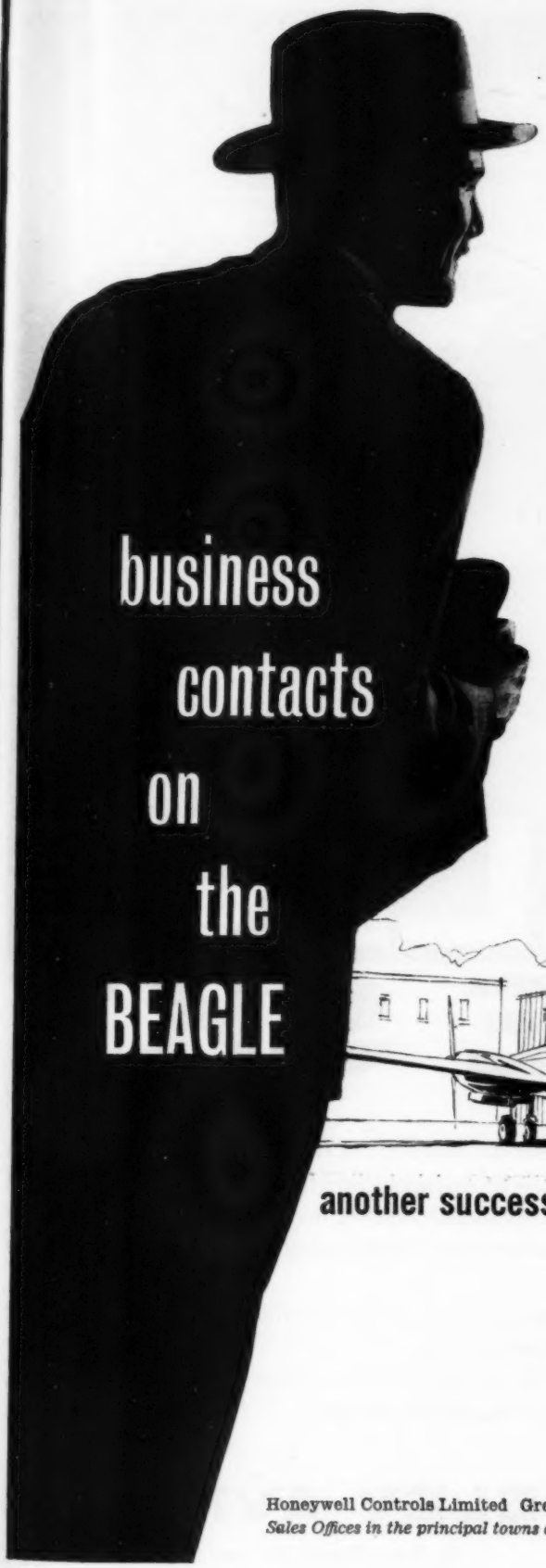
FERRANTI

First into the Future

Enquiries to :- **FERRANTI LTD.**
AIRCRAFT EQUIPMENT DEPT. MOSTON, MANCHESTER 10
Telephone : FAIlsworth 2071
or WESTWICK, BRACKNELL, BERKSHIRE
Telephone : Bracknell 1211

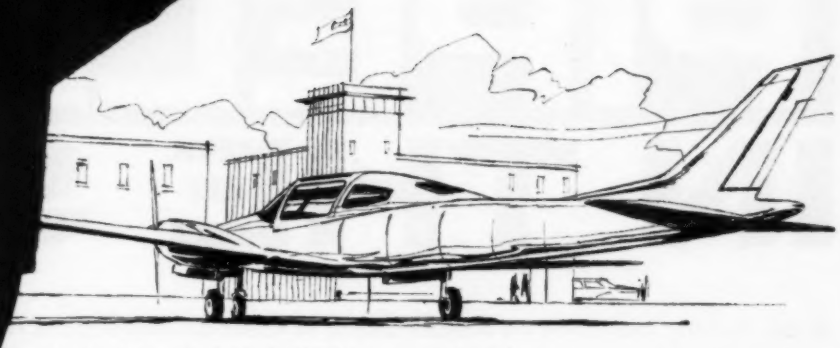
FAE 7

Second Class Postage Paid at New York, N.Y.



business contacts on the BEAGLE

Whether the pilot requires contact to be made many times a minute or a few times an hour, his call is answered precisely, surely by Honeywell's tiny snap-action devices.
On the newest executive aircraft—the Beagle B.206—they are located in 16 critical positions, where their functions include undercarriage lock, cabin door lock and tail trim actuation.
The 'business end' of vital circuits in virtually all leading aircraft, Honeywell Micro Switches are a lasting success wherever they are used.



another success for HONEYWELL MICRO SWITCHES

Honeywell

H HONEYWELL First in Micro Switches

Honeywell Controls Limited Greenford Middlesex Waxlow 2333
Sales Offices in the principal towns and cities in the United Kingdom and throughout the world

PIPELINE IN THE SKY

Riddle Airlines Inc. are flying Argosies up to 13 hours daily on the U.S.A.F. Logair routes. Logair is one of the world's largest scheduled cargo operations — an aerial pipeline for the quick supply of urgent military equipment. From coast to coast these new Armstrong Whitworth aircraft speed outsize military loads in their capacious 47 ft. long holds, over a network of routes covering the U.S.A. Daily schedules bridge more than 12,000 miles.

Soon, B.E.A. will be doing the same on their all-freight routes. Argosies will open up new high-speed supply lines for outsize cargoes between the U.K. and Europe.

An Argosy fleet means high speed delivery, reduced warehousing, less packaging, less handling time, less shipping cost and — above all — unusually large freight dimensions.

HAWKER SIDDELEY AVIATION

32, Duke Street, St. James's, London, S.W.1.

No 2743 VOLUME 81 THURSDAY 12 OCTOBER 1961

FLIGHT

Official Organ of the Royal Aero Club First Aeronautical Weekly in the World Founded in 1909

Editor-in-Chief
MAURICE A. SMITH DFC

Editor
H F. KING MBE

Technical Editor
W. T. GUNSTON

Air Transport Editor
J. M. RAMSDEN

Production Editor
ROY CASEY

Managing Director
H. N. PRIAULX MBE

IN THIS ISSUE

From All Quarters 570
Missiles and Spaceflight 572
Australia's Domestic Airline Operations 577
Swissair's Convair 880Ms in Service 578
Signs of the Times 581
Airstrip Airline 583
The Chequered Years 584
Italian Adventure 586
Sport and Business 591
Straight and Level 592
Air Commerce 593
Correspondence 600
Service Aviation 602

Iliffe Transport Publications Ltd, Dorset House, Stamford Street, London, SE1; telephone Waterloo 3333. Telegrams Flightpres London SE1. Annual subscriptions: Home £4 15s. Overseas £5. Canada and USA $15.00. Second Class Mail privileges authorized at New York, NY.

Branch Offices Coventry: 8-10 Corporation Street; telephone Coventry 25210. Birmingham: King Edward House, New Street, 2; telephone Midland 7191. Manchester: 260 Deansgate 3; telephone Blackfriars 4412 or Deansgate 3595. Glasgow: 62 Buchanan Street C1; telephone Central 1265-6.

New York, NY: Thomas Skinner & Co (Publishers) Ltd, 111 Broadway 6; telephone Digby 9-1197.

© Iliffe Transport Publications Ltd, 1961. Permission to reproduce illustrations and letterpress can be granted only under written agreement. Brief extracts or comments may be made with due acknowledgement.

Westland's New Alliance

INDECISION, antipathy, prejudice, timidity and technical difficulties have contributed in recent years to a turbulent state of affairs respecting Britain's helicopters and their commercial utilization. Confronted with manifold perplexities, Westland Aircraft Ltd, into whose hands design and production resources have been committed, have striven to rationalize the production situation without unduly compromising their far-sighted development programme. Thus, they announced last year that effort would be concentrated on the Rotodyne, Wessex, Gnome Whirlwind and what are known today as the Scout and Wasp. At the same time they announced that project work would continue on the Belvedere; an interim civil version of that helicopter, they declared, could be available by 1962, and could be followed by the 60-seater Type 194.

Meanwhile it became increasingly apparent that BEA's choice of interim equipment, pending availability of the Rotodyne, was most decidedly the Boeing Vertol 107. Like others, we have found ourselves wondering from time to time what effect the gratification of the corporation's wishes would have on the future of the Rotodyne, though within the past six months BEA have reaffirmed that this is still the only helicopter in the world holding promise of commercially self-sufficient services.

Extensive redesign of the Rotodyne's airframe was represented by models at Farnborough last year, and a major revision of its powerplant was evident in other models displayed this year. While the Westland and Rolls-Royce engineers have been progressively revising their ideas, the performance and economy of more conventional transport helicopters has been rapidly advancing, and some startling figures for American projects were quoted in our special international survey of VTOL aircraft published on May 12 last. In this connection it is significant that the Russians, who have achieved outstanding results in terms of speed and load-carrying with their giant Mi-6 "straight" helicopter, have nevertheless constructed an advanced type of Kamov convertiplane which has rightly been classed with the Rotodyne.

The future of the large commercial helicopter, then, continues to be technically unpredictable, though increasingly promising in the commercial sense. As an interim development the Vertol 107 agreement between Westland Aircraft and the Vertol Division of The Boeing Company, announced last week, must be accorded an unqualified welcome, not only in the BEA context, but because it opens up bright new prospects for home and overseas business.

Old Story: New Slant

THE news is given on page 574 that the weight of the joint US/UK ionospheric satellite has risen to such a degree that it can no longer be placed in orbit by a Scout launch vehicle with any degree of assurance. As a result, the much more expensive Thor-Delta combination may have to be used. Such news, although unwelcome, will come as no surprise to any engineer acquainted with the art and science of aeronautics. From the dawn of human flight, aircraft have always tended to get heavier; and in many cases they have been saved only by the fact that engines could usually be persuaded to produce more power as time went by. However, an eminent American scientist is quoted on page 574 as saying that, as one worked on launch vehicles, the latter tended to become "less powerful." Attainment of the new realm of flight is proving no walk-over, especially for Britain's first space payload.

FROM ALL QUARTERS

Military V/STOL Aircraft

UNDOUBTEDLY the most keenly contested military-aircraft competition outside the United States is that which is to provide NATO countries with V/STOL aircraft for a variety of tactical purposes. The competition is in two parts: submissions for a general-purpose transport have to be made by November 15; submissions for a strike and reconnaissance aircraft must be completed by December 31.

Little is known regarding the runners in the "NMBR-4" transport race, although a clue is provided by the design of an essentially similar aircraft for the US Air Force, Navy and Army which won the recent tri-Service competition in the USA. Successful contenders were Ling-Temco-Vought, Ryan and Hiller, and their proposal is a four-turboprop, tilt-wing machine of most attractive appearance. The 67ft 6in wing tilts through 100°, and is entirely "blown" by the 15ft interconnected propellers turned by four 2,850 e.h.p. General Electric T64-6 turboprops. Combat radius with full payload of 8,000lb (32 troops) should be at least 250 n.m., cruising at more than 250kt. Maximum speed will be about 400kt, and ferrying range with extra tanks as much as 2,600 n.m.

Ryan Aeronautical Co, one of the partners in this design, now announce that they are submitting bids for both sections of the NATO competition (in each case associated with one or more European manufacturers).

British V/STOL transports, except for a proposed Argosy derivative, appear to be tailored to the global requirements of the RAF, rather than to the battlefield-type operations of NATO. Unofficial reports continue to suggest that the British Aircraft Corporation's 222 (described in our June 1 issue, page 732) is out of the running. This was to have been a derivative of the Lockheed C-130 Hercules, with a hold increased in depth from 9ft to 10ft to meet Air Ministry requirements. Propulsion would have been provided by four Rolls-Royce Tynes, with Rotodyne-type auxiliary compressors for blowing the flaps and control surfaces. One reason for the apparent demise of this project is that, as reported on September 6, the Rotodyne may not now use such auxiliary compressors.

According to several unofficial reports, the two aircraft now competing for MoA sponsorship are the Bristol 208 (British Aircraft Corporation) and the Armstrong Whitworth 681 (Hawker Siddeley Aviation). Both aircraft will be powered by four Bristol Siddeley lift/thrust engines; sketches published by the engine manufacturer show four separate nacelles as on a Boeing 707, though control problems would be eased by grouping the engines well inboard. If the powerplant is to be the Pegasus, both designs may have gross weights in the neighbourhood of 80,000lb, and speeds comparable with current jetliners (they would probably be over-powered in the cruise régime). These aircraft will not be capable of true VTOL until more powerful engines become available, or until batteries of specialized lift engines are added.

Designation of the strike aircraft competition is BMR-3, which the *Daily Telegraph* interprets as standing for Basic Military Requirement. Manufacturers are undoubtedly left to decide for themselves whether to employ lift/thrust engines or composite propulsion (separate lift and propulsion engines, probably with full deflection on the latter). According to the American journal *Aviation Week*, BMR-3 stipulates a minimum sea-level speed of M0.92, but it is clear that contenders are expected to do better than this.

Derivatives of the Hawker P.1127 would be obvious British entries, and virtually all the power specified in the submissions would be provided by Bristol Siddeley or Rolls-Royce. Especially intriguing is the Republic/Fokker contender, planned around a single Bristol Siddeley BS.100 lift/thrust engine. Unofficial reports state that this impressive powerplant will have a thrust in excess of 35,000lb, and that its development is being partially financed through the Mutual Weapons Development Program. The only facts known about the Republic/Fokker are that it has variable geometry, and that the thrust of the engine chosen releases it from crippling weight restrictions and may enable it to score on range.

Other entries are: the Dassault-Sud Balzac, essentially a Mirage III provided with four Rolls-Royce RB.162 lift engines between the intake ducts to the propulsion engine; the Messerschmitt/Heinkel/Bölkow VJ-101, which is believed to have a quartet of RB.162s at each wing-tip and an engine of some 20,000lb thrust for propulsion; and the Fiat G.95, with two pairs of unspecified Rolls-Royce lift engines and two Bristol Siddeley propulsion turbojets. Notes on the Fiat aircraft were given in *Flight* for June 1 (page 737).

Napier Aero Engines' Board

NAMES have been announced of the board members of Napier Aero Engines Ltd, the new company owned jointly by D. Napier and Son Ltd and Rolls-Royce Ltd and formed to carry on the Napier aero-engine business. They are as follows: Mr J. D. Pearson (chairman), the Hon George Nelson (deputy chairman), Mr H. E. C. de Chassiron (managing director), Viscount Caldecote, Mr F. T. Hinkley, Sir Archibald Hope (director of sales), Mr A. A. Lombard, Sir John Paget (works director) and Mr A. J. Penn.

Concurrently, the board of D. Napier & Son has been reconstructed as follows: the Hon George Nelson (chairman), Mr G. A. Riddell (deputy chairman), Mr P. J. Daglish (managing director), Viscount Caldecote, Mr H. E. C. de Chassiron and Mr P. Horsfall.

Beagle and Shoreham

OUTLINING plans for the development of Shoreham Airport, Mr Peter Masefield, managing director of British Executive and General Aviation Ltd, said last week that the new Beagle aircraft factory there would ultimately provide employment for 800 people. Construction of a runway to facilitate the use of the airport by airlines, including car-ferry services, was being discussed with the local authorities.

H. R. Vaughan-Fowler

WE regret to record the death of Wg Cdr Hugh Raymond Vaughan Fowler, of Bombay, editor of *Asian and Indian Skyways* and a number of other aeronautical publications in India. Born in England in 1899, Wg Cdr Vaughan-Fowler served in the RNAS and RAF in the closing years of the 1914-18 war and was a pilot with Handley Page Transport in 1920-21. A Martlesham Heath test pilot from 1924 to 1927, in the following year he founded the Far East Aviation Co Ltd and then the Hong Kong Flying Club. During World War Two he was appointed Senior Areodrome Inspection Officer of the RAF in India, and since that time had remained largely in India, doing much valuable work to encourage aviation there and to bring the Indian and UK industries closer together.

His death, from heart failure, took place suddenly on the night of September 24, when he was staying in London, at the Royal Aero Club, on his way back to India from America.

AMONG THE BOARD MEMBERS of the new Napier Aero Engines Ltd (see news-item above) are, left to right, Mr J. D. Pearson, the Hon George Nelson, Mr H. E. C. de Chassiron, Viscount Caldecote, Mr F. T. Hinkley and Mr A. A. Lombard

SERVICE ATTACHES and assistant attachés from 18 countries recently visited the factories of Armstrong Whitworth Aircraft at Baginton and Bitteswell to see Argosy production. They flew from Northolt in an Argosy C.1 of Transport Command. In this group are seen, left to right: Air Cdre W. Wynter-Morgan, AWA Services liaison officer; Col T. Mosimann, Switzerland; Sqn Ldr Thomson; Col A. Bitar, Jordan; Maj W. A. Baldwin, USA; Capt L. Koho, Finland (almost obscured); Gp Capt C. Suthichote, Thailand; Mr R. E. LeLong, AWA general sales manager; Col G. Dinculescu, Rumania; Col C. R. R. Manoers, Netherlands; Gp Capt Wakelin; Col M. Roman, Poland; Col V. Csapo, Hungary; Lt-Col E. Saurez, Venezuela; Lt-Col V. P. Konobeev, USSR; Lt-Col Z. Loncar, Yugoslavia; Col P. N. Chergilanov, Bulgaria; Col F. Danieli, Italy; Wg Cdr R. Whittam, Air Ministry; Capt (naval) Y. Takahashi, Japan; Col Aye Maung, Burma; Lt-Col J. B. Danielson, Denmark; Sqn Ldr B. A. Ruben, Sweden; Mr E. S. Greenwood, PA to managing director, AWA

Fairey's New Chairman

FOLLOWING a reorganization of responsibilities on the board of the Fairey Co Ltd, Mr G. C. D'Arcy Biss has been elected chairman. Mr G. W. Hall, the former chairman, remains a director of the company as well as being chairman of Avions Fairey SA, the Belgian subsidiary. Mr Raymond E. Purves, chairman of the Australasian subsidiary, has been invited to join the parent company's board.

Mr D'Arcy Biss, who joined the board in 1959, is a senior partner in the firm of Ashurst, Morris, Crisp & Co, who have been the company's solicitors since its formation in 1915.

Vivian Cody

ON Tuesday of last week, October 3, Vivian Cody, BEM, died at Farnborough, Hants, aged 76.

A son of S. F. Cody, who was the first man to make a sustained powered flight in this country, Vivian Cody also played a considerable and lengthy part in aeronautical research. He joined the staff of the Royal Balloon factory at Farnborough (now the Royal Aircraft Establishment) in 1906 and as well as helping his father build Army Aeroplane No 1 was responsible for the design and construction of the envelopes for the first airships to be built there.

During the 1914-18 war young Cody worked on perfecting aeroplane fabric coverings and on the design and construction of mobile hangars for use in France. He was also concerned with research into early parachutes. Between the wars his work included development of the first high-altitude and electrically heated flying suits. During the Second World War he was responsible for the improvement of much of the safety equipment used by aircrew. He retired from the RAE in 1950.

Vivian Cody was born in Texas in 1885 while his father was touring with a circus. From the age of five he made stage appearances in "Wild West" acts and in 1896 he toured English music halls with his family in a Klondyke Gold Rush melodrama. It was during this period that his father began his manlifting-kite experiments; and soon after the latter was appointed kite instructor to the Royal Engineers in 1905 Vivian and his brother Leon were engaged to assist.

BAC Appointments

THREE appointments in the British Aircraft Corporation were announced last week-end. Mr A. H. C. Greenwood is to be manager, aircraft sales and service; Mr D. J. Lambert will be technical sales manager (civil aircraft); and Mr J. R. Ewans is to be technical sales manager (military aircraft).

Mr Greenwood joined the aircraft side of Vickers-Armstrongs in 1940, and after service in the FAA rejoined them in 1946; he was appointed deputy general manager in 1957 and is now a director of Vickers-Armstrongs (Aircraft) Ltd. Mr Lambert has been closely concerned with Vickers design since 1940, latterly on the Viscount and Vanguard and now on the first BAC civil design, the One-Eleven. Mr Ewans was at RAE before the war, and then with Blackburn and A. V. Roe. Deputy chief designer of the latter firm in 1955, he was until recently a director and chief engineer of their Aircraft Division.

IN BRIEF

The visit of Queen Elizabeth the Queen Mother to RAF Leconfield, previously announced for October 28, is now to take place on Monday, October 23.

Grounding of the Convair F-106 Delta Dart (holder of the world speed record at 1,525 m.p.h.) was announced by the US Air Force on September 27. Three crashes, one fatal, show no likely common cause. About 240 of the J75-powered intercepters are in use.

Air Cdre F. E. Tyndall has been appointed Director of Electronics Research and Development (Air), Ministry of Aviation, in succession to Air Cdre A. G. P. Brightmore, who is going to Air Ministry as Director of Radio. Both appointments will be effective from November 1.

"RESOLUE," France's first helicopter carrier—designed for the job, and replacing the old "Jeanne d'Arc"—was launched recently at Brest

Lockheed Aircraft Corporation now completely own Grand Central Rocket Co, as a result of an agreement with Petro-Tex Chemical. Lockheed previously had a half ownership.

Canadian Pratt & Whitney announce that the PT6 free turbine "has one of its first prototype airframe applications in Hiller's new helicopter, Model 1099, which has been flying for several months." This six-seat machine has clamshell rear doors for passengers and cargo.

The "Blue Diamonds" Hunter aerobatic team of No 92 Sqn is on its way to Nicosia, Cyprus, this week, preparatory to a visit to Iran. On October 20 it will give a display at Meherabad in celebration of Iranian Air Force Day.

A Republic F-105D recently covered 1,520 miles from Eglin AFB, Florida, to Nellis AFB, Nevada, in a low-level flight which included a simulated bombing attack on a target in Arizona. Using experimental electronic navigation and bombing equipment, the pilot—Lt-Col P. Hoza—flew at 500ft-1,000ft except during a climb for air refuelling.

The annual Service of the Guild of Air Pilots and Air Navigators will be held at St Michael's, Cornhill, London EC3, at 5 p.m. on Thursday, November 30. It will be preceded at 2.30 p.m. by the Professional Licence Holders' meeting at Innholders Hall, College Street, EC4, and followed at 6.30 p.m. by the Guild's a.g.m., also at Innholders Hall.

Hawker Siddeley Aviation announced last week-end that Rear Admiral G. C. Ross has joined Blackburn Aircraft Ltd as Service liaison officer. From 1945 until 1953, when he retired from the Royal Navy, he was Director of Aircraft Maintenance and Repair, Admiralty. He was subsequently with Armstrong Siddeley and then with the Hawker Siddeley sales organization.

According to the *Daily Telegraph*, the appendix to NATO Specification BMR-3 (discussed in the news-item "Military V/STOL Aircraft") includes ten US electronic firms but not one British. The report says "The Ministry of Aviation is making representations to the NATO authorities," and stresses the fact—evident from *Flight's* special Electronics issue last week—that many British firms have for a long period been working on equipment for TSR.2, to a similar type of specification.

Missiles and Spaceflight

Washington Congress

From KENNETH OWEN

President of the IAF is Leonid I. Sedov, whose address to the Congress is referred to in column 1 below. Conspicuously absent were his compatriots Gagarin and Titov, who were refused US visas

"ALL the shrines and monuments of your Nation's Capital virtually surround the Marriott Twin Bridge," ran the Marriott Motor Hotel's welcoming brochure. "It is only two minutes from the Jefferson Memorial, Lincoln Memorial and Arlington Cemetery. Only four minutes from the White House. Located on Highway US 1 and Virginia 350 (Shirley Freeway), between Washington National Airport and the Pentagon. Only three minutes from the central business district of Washington, the Marriott is your most convenient headquarters for business and pleasure."

Last week the Marriott was also our most convenient headquarters for the twelfth Congress of the International Astronautical Federation. Delegates were being exposed to 21in Television and Hi-fi Radio in Every Room, Automatic Guest Laundromat, two fine Hot Shoppe restaurants, Conveniently Located Soft Drink Machines and Free Ice, Free Parking Spaces, Fast and Convenient Drive-in Registration and Checkout—and much more besides. It certainly made a change from the Royal Institute of Technology in Stockholm last year—and from Church House, Westminster, the year before.

But, on Monday, October 2, it was in the auditorium of the Natural History Building of the Smithsonian Institution that delegates gathered for the official opening ceremony. They were welcomed by Dr Samuel Herrick, chairman of the congress committee, and then heard the opening remarks of IAF President Leonid I. Sedov of the Soviet Union, followed by an address by the Deputy Administrator of the National Aeronautics and Space Administration, Dr Hugh L. Dryden.

Dr Herrick's welcome was extended on behalf of the three host societies—The American Rocket Society, American Astronautical Society and Aerospace Medical Association. Academician Sedov traced the achievements which had marked the first four years of the "cosmic era" and mentioned, in addition to the achievements, the birth of projects the results of which "will astound the world in the near future." The developments of spaceflight had had a great influence not only on science and technology but on many other aspects of life also.

International co-operation on a world scale in cosmic exploration was greatly needed and would be of great use, Academician Sedov stated, but at present was unfortunately limited. One major task of the IAF was to facilitate and promote such co-operation, and the contacts made and information exchanged at the Federation's congresses formed a good basis for developing the wider co-operation and improvement in international relations which was needed so badly at the present time.

Astronautics and Peace

Dr Dryden recalled that the IAF had been founded in 1950, and Article 1 of its first constitution had stated that the Federation "shall exist to promote and stimulate the achievement of spaceflight as a peaceful project." In recognition of the manner in which astronautics had developed during its first four years, a proposed new draft of the IAF constitution to be considered at the Washington meeting listed as the first objective "To advance the development of astronautics for peaceful purposes."

The IAF constitution included four additional aims, Dr Dryden continued, which might be summarized as the widespread dissemination of technical and other information; stimulation of public interest and support; encouragement of participation in research by international and national agencies and individuals; and co-operation with international and national agencies in all aspects of the natural and social sciences related to astronautics and the peaceful uses of outer space.

Dr Dryden continued: "Space exploration has advanced from the realm of phantasy and dream, through the stage of discussion of conceptual schemes to a demonstration of technical feasibility. The greatest needs of the immediate future are the stimulation of widespread public support nationally and internationally and the achievement of co-operative efforts on a global scale.

"Widespread public support requires a major effort from all of us to interpret to people of many backgrounds not only the 'how' but also the 'why' of space exploration. To describe our objective merely in terms of a technical task, i.e. to send a three-man expedition to explore the Moon, fails to secure the support of many, particularly of my generation. We must explain again and again the role in a scientific and technological age of an activity which catalyzes and integrates the expansion of the frontiers of knowledge. The real values lie in the major development in science and technology, applicable to what man will do in space rather than in the mere accomplishment of setting foot on the Moon.

"The large sums of money required in this effort are not spent in outer space or on the Moon; they are spent in the factories, workshops, and laboratories for salaries, materials and supplies. The new knowledge and experience are transferable to other areas of industry, as in the past in the development of the automobile, aeroplane, and nuclear reactor. Education will profit. Society will gain through the discipline of co-operation in a major task. We must convince the public that the exploration of space is an activity of critical importance for the future of science, industry, education, and public welfare in every nation, and that funds so spent will return benefits many-fold. Perhaps the lessons of the history of aeronautics may help . . ."

Technical Sessions Begin

The technical sessions of the congress got under way on the morning of Tuesday, October 3, when the Persian Ballroom 1, Potomac Ballroom and Persian Ballroom 2 of the Marriott resounded respectively to talk of space propusion, astrodynamics, and space law. Included in the propulsion papers were *Status of the US Nuclear Rocket Program* by Harold B. Finger of NASA; *Propulsion of the Final Stage of a Satellite Launcher Using Liquid Hydrogen as Fuel* by A. W. T. Mottram of Bristol Siddeley Engines; and *Examination of the Characteristics of Propulsion Sytems for Inter-orbital Transfer*, written by P. A. E. Stewart of Hawker Siddeley Aviation and read at the congress by Dr W. F. Hilton.

Mr Mottram's paper was concerned with the possible design of a third stage of the proposed Blue-Streak-based three-stage European vehicle. The benefits derived from the high specific impulse which could be achieved using hydrogen outweighed the disadvantages of low density, he indicated, and the need for accurate injection into orbit made the use of a low-thrust vernier phase attractive for the liquid hydrogen/liquid oxygen third stage envisaged. How long should this vernier phase last?

Beyond a certain duration it became necessary to extend the vernier phase, because of the siting of control centres, to include one complete circuit of the Earth. This offered two additional advantages: the vehicle was under power all the time, avoiding the need for re-orientation and re-light after a coasting phase; and the final phases of the trajectory, where maximum guidance accuracy was needed, would be within range of the launching site. Most of the guidance equipment could be concentrated, so reducing cost and communication difficulties, and the author had therefore chosen this type of trajectory.

A useful payload of 1,015lb could be launched into a 5,000-mile circular polar orbit using liquid hydrogen, compared with 600lb using hydrogen peroxide/kerosine (in which case four stages would be required). Both types of vehicle would use the same expensive booster stages.

A further example of the potential of liquid hydrogen was offered by Mr Mottram in the form of a suggested two-stage vehicle based on Black Knight. The addition of a liquid-hydrogen second stage would make possible the launching into orbit of a 300lb payload into a 300-mile circular orbit at "a remarkably low cost."

Mr Finger, who is Assistant Director for Nuclear Applications of NASA and manager of the joint NASA/Atomic Energy Commission Space Nuclear Propulsion Office, gave a lucid review of the US nuclear-rocket scene. When one viewed the requirements of extensive exploration of space, he pointed out, it became evident the propulsion systems having high specific impulse were essential if manned interplanetary flights were ever to occur. Current rocket

engines, producing thrust from the energy liberated in a combustion process, were limited in specific impulse by the obtainable temperatures of combustion and by the relatively high molecular weights of the combustion products. Chemical systems could produce thrust at specific impulses up to 500lb of thrust for each pound of propellant flow per second, and this level of specific impulse was insufficient for extensive manned missions to be accomplished practically.

Several systems had been proposed to provide high specific impulse motors through the application of nuclear energy. The two which were receiving major emphasis in the United States were the nuclear heat transfer rocket (Rover) and the nuclear-powered electrical propulsion systems. Of these two, the greater emphasis was placed on the nuclear rocket engine.

The present objectives of the nuclear rocket programme, Mr Finger stated, are to provide the necessary technology and experience for the ultimate utilization of nuclear rockets in a wide variety of space missions. As such, the programme involves ground tests of reactors, the development of the NERVA (Nuclear Engine for Rocket Vehicle Application) engine, plans for flight-testing a nuclear propulsion system, an extensive safety programme, and work in areas of advanced technology.

Justifying Nuclear Propulsion

The justification for the development of nuclear rocket propulsion systems is found in the analyses of manned planetary missions. The exploration of Mars, for example, would require a spacecraft weighing 9,000,000lb in an Earth orbit, if chemical propulsion exclusively were employed for the trip to Mars and return. Such spacecraft weights may be totally impractical whereas, if nuclear rockets were used, the weight of the spacecraft would be reduced to some 900,000lb. Economic analyses indicate that the money saved on a single trip to Mars using nuclear propulsion would be more than enough to pay for the development costs of nuclear rockets. Without even questioning the relative practicability of building 9,000,000lb and 900,000lb spacecraft in orbit around the Earth, therefore, one can conclude that nuclear propulsion is desirable—and, indeed, necessary—for manned interplanetary flights.

The advantages of nuclear propulsion for a variety of missions was recognized as long ago as 1955, when the Los Alamos Scientific Laboratory in New Mexico began studies and experiments to demonstrate the feasibility of reactors for nuclear rockets. These efforts led to the KIWI-A series of reactor experiments in 1959 and 1960 which were conducted at the Nevada test site by LASL. The success of these KIWI-A experiments provided the technical basis for expansion of the programme to meet the broad objectives of engine development and flight testing.

To provide the proper management of the expanded nuclear rocket programme, the responsibilities for the programme were vested in the Space Nuclear Propulsion Office. This office reports to both the Atomic Energy Commission and NASA, thereby combining in one office the responsibilities of both agencies for nuclear propulsion developments.

After the formation of the SNPO, an industrial contractor team was selected to develop the first nuclear rocket engine, designated NERVA. Plans for additional reactor experiments—the KIWI-B series—were established and the necessary reactor test facilities have progressed towards completion. In addition, design and construction of the facilities required for the nuclear engine development programme has begun.

For some time, methods of flight-testing nuclear engines have been under investigation in a study programme known as RIFT (Reactor In Flight Test). Early next year an industrial contractor will begin development activities on a RIFT vehicle to meet the objectives of achieving flight testing in 1966-67. On current ideas the initial flight test will be accomplished using a Saturn-class first stage to launch the nuclear system on a short-range, ballistic flight down the Atlantic Missile Range. After such flights have been accomplished it is expected that more extensive testing involving escape missions and orbital starts will be attempted, leading to operational space applications.

Safety is one of the major concerns of the nuclear rocket programme, and mission profiles and launch operations are being carefully examined to uncover the possible sources of hazards to launch crews and the general public. Systems to ensure safe operations will be provided during the course of the programme leading to flight testing.

The remaining sessions on Tuesday were devoted to the fourth colloquium on the law of outer space (which we hope to report in a forthcoming issue), energy conversion, astrodynamics (optimization theory and landing guidance) and a panel discussion on high-performance combustion systems.

Among the papers presented were *Development of Nuclear Power in the United States for Space Applications* by Lt-Col G. M. Anderson and Cdr D. L. Jarrell of the Atomic Energy Commission, *Dynamic Flight Vehicle Power Systems* by George Sherman of USAF Systems Command, *Space Power Sources by Thermoelectric and Thermionic Emission Processes* by P. H. Egli of the US Naval Research Laboratory, *Optimum Soft-landing Trajectories* by L. J. Berman of Massachusetts Institute of Technology, and *Terminal Guidance and Control Techniques for a Soft Lunar Landing* by B. A. Kriegsman and M. H. Reiss of Raytheon Co.

Also included, as an appendix to *The Social Impact of Communications Satellites* presented by Arthur C. Clarke before the space law meeting, was a reprint of a 1945 article published by our sister journal *Wireless World*. Written by the same author and entitled *Extra-terrestrial Relays*, this paper is believed to be the first ever published on the subject of communication satellites.

At a National Aeronautics and Space Administration reception that evening Dr L. R. Shepherd of the British Interplanetary Society presented Dr Wernher von Braun with a Gold Medal of the Society.

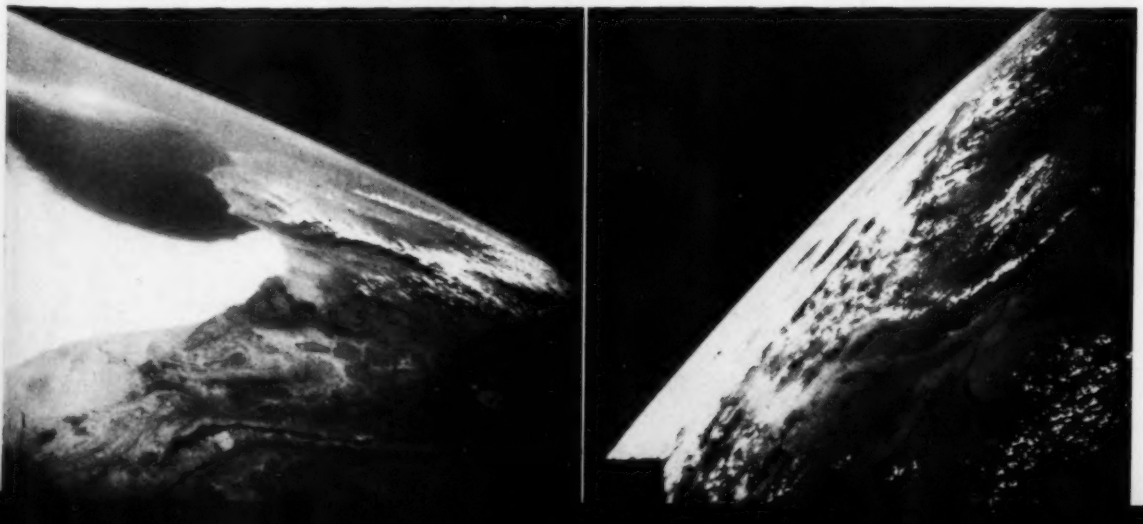
The first papers at the congress on the subject of bio-astronautics were presented on Wednesday, October 4. They included *Psychological Approach to the Study of Fatigue in Space Flight* by Lt-Col David G. Simons of the USAF Aerospace Medical Center, *Psycho-Physiological Reactions to Weightlessness as observed on subjects during recent Bio-ballistic and Bio-satellite Experiments* by Harold Von Beckh of the USAF Missile Development Center, *Some Results of Physiological Reactions to Space Flight Conditions* by Oleg G. Gazenko and Vladimir I. Yazdovsky of the USSR, *Flight Safety Systems for Advanced Manned Space Missions* by T. F. Heinsheimer of General Dynamics/Astronautics, and the intriguing *On the Possible Existence of Intelligent Living Beings on Other Planets* by Rodolfo Margaria of the University of Milan. The previous days' sessions on space law and high-performance combustion systems were continued.

Other subjects discussed during October 4 included trends in combustion research resulting from space exploration, and the exploration of the solar system by radar and radio astronomy. The scheduled contributors to the latter sessions included T. N. Nazarova, K. I. Gringauz and Vladimir A. Kotelnikov of the USSR, Dr John Thomson from Jodrell Bank, T. R. Kaiser of Sheffield University and Zdenek Kopal of Manchester University.

At a luncheon meeting of the National Capital Section of the American Rocket Society on the same day, the Secretary General of the International Telecommunications Union, Mr Gerald C. Gross, spoke on the subject of the ITU and space communications.

[*To be concluded*]

These photographs show the degree of definition achieved with the 70mm camera carried by the unmanned Mercury capsule (MA-4) which made a single orbit on September 13. During its 109min flight the capsule passed over Morocco (left) and central Africa (right, showing Lake Rudolph in the centre of the picture). MA-4 achieved an apogee of 158 miles, and these pictures were taken at an altitude of about 100 miles



Contour cable is the name given by Hughes Aircraft to a wide range of new forms of multi-channel electrical conductor developed for missile applications. On the left is an assortment of cables consisting of strip and foil carried on plastic ribbon; on the right is a 576-channel connector for a missile checkout equipment, which within a length of 26in incorporates a static 90° bend and a dynamic 270° twist—a bend/twist performance which would be impossible with 576 wires made up into a single conventional cable

Missiles and Spaceflight . . .

THE ESLO CONFERENCE

Seven of the 12 nations invited to discuss the Anglo-French proposals for a European Space Launcher Organization have accepted and will send delegates to the conference. This welcome news is given in an announcement by the Ministry of Aviation dated October 2, which states:—

"Countries represented at the Strasbourg Conference earlier this year have now replied to the Anglo-French invitation to take part in a further conference to draw up a convention under which the European Space Launcher Organization would operate.

"So far Germany, Belgium, Denmark, Spain, and the Netherlands have agreed to attend. Austria, Switzerland and Norway have declined, and replies are still awaited from Italy and Sweden.

"It is hoped to arrange the conference in London at the end of October."

On the day that this statement was issued, the Prime Minister called the following Ministers to a conference at Admiralty House: Mr Thorneycroft, Minister of Aviation, who has been in charge of the negotiations with other European countries; Mr Selwyn Lloyd, Chancellor of the Exchequer; Lord Hailsham, Lord President of the Council and Minister for Science; Mr Watkinson, Minister of Defence; Mr Heath, Lord Privy Seal; Mr Amery, Secretary of State for Air; Mr Braine, Under-Secretary of State for Commonwealth Relations; and Mr Bevins, Postmaster-General.

FROM SCOUT TO DELTA

The first joint US/UK ionospheric satellite may have to be launched by Thor-Delta vehicle from Cape Canaveral instead of by the much cheaper Scout from Wallops Station, Wallops Island, Virginia. This was stated in Washington on October 2 by Dr Arnold Frutkin, Director of International Programs of the National Aeronautics and Space Administration.

Dr Frutkin said that it was "normal experience" that as one worked on satellites, the latter steadily became heavier than originally envisaged; and, as one worked on launch vehicles, the latter became "less powerful." A combination of these two factors meant that, to ensure that the orbital requirements were met, the choice of a different vehicle might be necessary. The British instruments in the first joint satellite, he added, were of sufficient interest for NASA to want to make sure that they had every chance of achieving orbit. The Thor booster, first stage of the Delta vehicle, was known to be reliable, whereas the Scout was new. The launch date for the joint satellite was " hopefully, in the first half of next year."

MARINER TO USE ATLAS-AGENA B

Severe delays in the development of the Atlas-Centaur launch vehicle are reflected in the following NASA announcement, which was made on September 29:—

"The National Aeronautics and Space Administration is planning to launch a Mariner spacecraft on an Atlas-Agena B rocket for a mid-1962 flight to the vicinity of Venus. The mission will take advantage of the first opportunity for a Venus flight—when the Earth and Venus are in the most favourable relative positions—and provide

Progress with the satellite communications aerial being erected by the American Telephone & Telegraph Company near Andover, Maine, is evident from the photograph on the left; the 300-ton aerial is protected by an inflated flexible sphere. On the right is a new photograph, issued by Tass on October 4, of the radio telescope now in use by the Soviet Academy of Science

ROLLS-ROYCE

SPEY

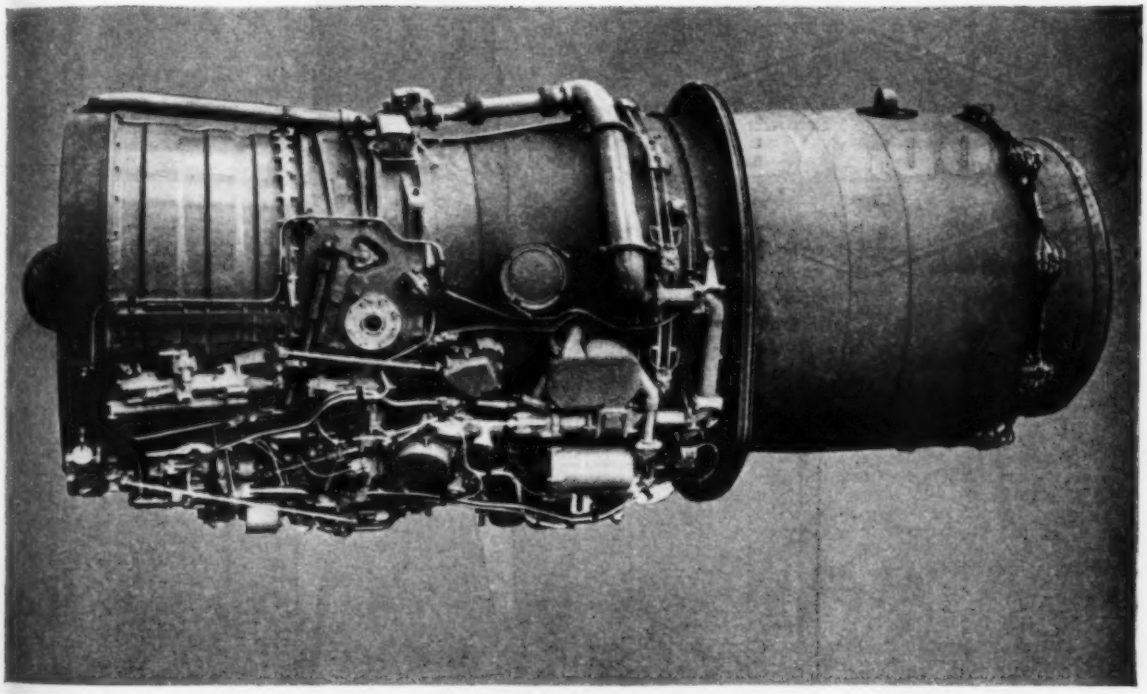
WILL POWER THE

DE HAVILLAND TRIDENT

B.A.C. ONE-ELEVEN

BLACKBURN BUCCANEER S2

BY-PASS JET

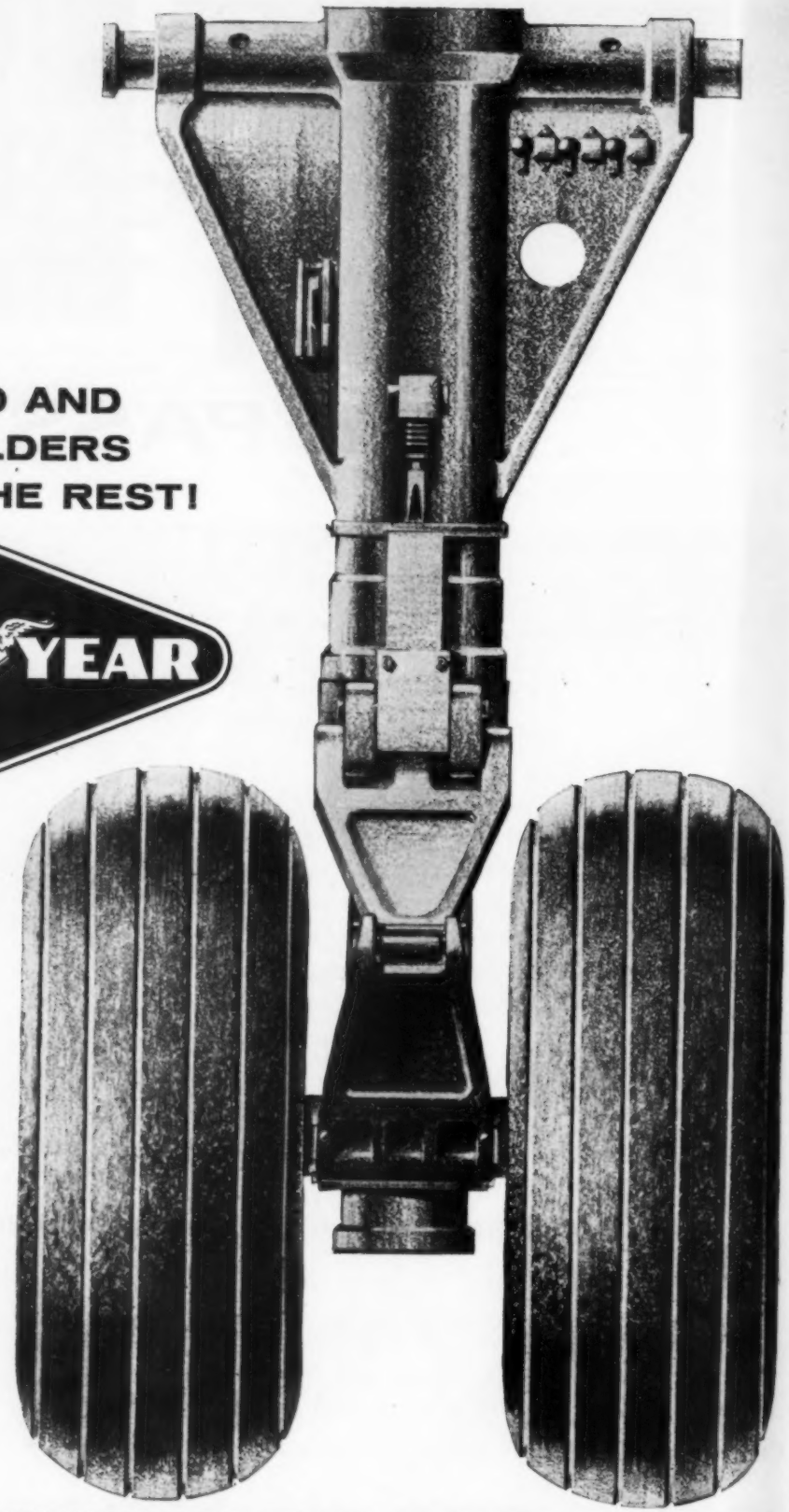


PERFORMANCE with ECONOMY—

the Spey has been designed to give low fuel consumption, low maintenance cost and long overhaul life.

AERO ENGINES · MOTOR CARS · DIESEL AND PETROL ENGINES · ROCKET MOTORS · NUCLEAR PROPULSION

Expansion creates a number of outstanding opportunities for top grade Mechanical Designers and Development Engineers. Write to The Manager, Technical Administration, Aero Engine Division.



TREAD AND
SHOULDERS
ABOVE THE REST!

GOODYEAR

TYRES · WHEELS
BRAKES
ANTI-SKID EQUIPMENT
BRAKE CONTROLS

SERVING AVIATION THE WORLD OVER

Aviation Division, London Airport & Wolverhampton

Missiles and Spaceflight . . .

an early test of basic equipment which will be used in later interplanetary flights.

"A Centaur-launched Mariner probe had been scheduled for mid-1962. The change in launch vehicles is being made in the interest of increased reliability to be expected from the greater number of Atlas-Agena B rockets which will have been fired before the Venus flight.

"The modified Mariner spacecraft to be launched on the Atlas-Agena B will weigh about 400lb. Under study for inclusion in the probe are a fluxgate magnetometer to investigate magnetic fields in space; radiation experiments to detect and count energetic particles from the sun and from outside the solar system; a micrometeoroid detector; and a radiometer to scan the surface of Venus for temperature distribution."

It appears that the wording of this release is euphemistic. In fact, the change in launch vehicles is being made with reluctance, for the reduced overall impulse of the Atlas-Agena B is certain to demand a very great cut in payload. The figure of "about 400lb" given in the NASA statement compares with the full design weight of 1,100lb for the fully loaded Mariner spacecraft, a photograph of which was published on page 886 of our June 29 issue.

X-15 GETS HOTTER

North American's X-15 hypersonic research aircraft continues to explore its performance envelope and stability characteristics in a satisfactory manner. On September 28, as a result of the flight profile being chosen to level-off at 82,000ft, dynamic pressures and kinetic heating were experienced considerably in excess of anything to which any aircraft has previously been subjected (photograph overleaf). The pilot was Cdr Forrest Petersen, US Navy, who said that the temperature of the Inconel X skin of the nose had reached "possibly 1,100°F," so hot that smoke from burning paint and protective surfaces inside the aircraft came "right out under the front of the instrument panel into my face." He went on to say "if it was dark enough the plane might glow in the heat, but I couldn't see the wings or anything out of the cockpit anyway . . ."

As on previous occasions, the aircraft was launched from the NB-52 mother-ship operating from Edwards AFB. A news agency states that the latter was flown by Maj Jack Allavie, and that "his co-pilot once again was Sqn Ldr Harry Archer, an exchange test pilot from England." Speed reached by the X-15 was 3,545 m.p.h., the total free-flight time being about 10min. It seems certain that several parts of the skin did, in fact, go beyond 1,000°F; the previous highest temperature reached was 850°F.

On October 4, in an entirely different type of experiment, stability and control characteristics were investigated in level flight at 2,850 m.p.h. at 79,000ft. The ventral fin of the X-15, which is always jettisoned before landing, was not attached at all, tunnel testing having shown that the stability of the aircraft would be acceptable without it. Moreover, the pilot, Maj Robert Rushworth, USAF, deliberately switched off portions of the autostabilization and autopilot/stable-platform systems several times, yet was still "able to handle the craft safely."

HUGHES ION ENGINE

An accompanying photograph shows the "business end" of an ion engine constructed and operated by Hughes Aircraft at their research laboratories at Malibu, Cal, under contract from NASA. Hughes started the work for the Marshall Space Flight Center in September 1960, with an initial contract worth some $460,000. The company have published detailed descriptions of the engine and research equipment associated with it, but the following brief description is provided by Dr Malcolm R. Currie, associate director of the Malibu laboratories:—

"The propellant used in this type of engine is cesium, because of all the possible chemical elements cesium atoms are most easily converted into ions. This propellant is stored in a reservoir from which cesium vapour is diffused through a hot tungsten element, which ionizes the cesium by a process known as contact ionization. There then follows a system of electrodes to which voltage is applied in order to accelerate the ions to a very high exhaust velocity. Finally, the high-velocity ion beam passes through a neutralizer region in which electrons are injected into the ion beam to provide space-charge neutralization of the electric field associated with positive cesium ions. It is necessary to emit electrons at exactly the same rate as ions from the vehicle in space because, if only positive ions were ejected, the vehicle would charge up negatively until it pulled the ions back to the ship. Moreover, it is necessary that the electrons be intimately mixed with the positive ions very close to the vehicle to produce equal positive and negative charge densities everywhere in the beam. If this detail space-charge neutralization is not achieved, the thrust can be reduced significantly by beam divergence and by return of the beam to the vehicle."

On September 27 the engine was demonstrated to the Press, who saw it operating in a vacuum chamber which as nearly as possible duplicates space conditions. Also displayed was an advanced computer-controlled analogue trajectory tracer, which simulates the electrical conditions in the engine and permits the exact paths taken by the ions to be determined in order to assist in the design of optimum electrode configurations. Late next year a Scout launch vehicle is to lift a capsule containing a refined version of the engine, together with another powerplant produced by the NASA Lewis Research Center. The trajectory will be almost vertical, to an apogee of about 5,000 miles; this will provide a flight of about 1hr in which to demonstrate the behaviour of the engines when operating well outside the atmosphere. It is expected that a complete ion propulsion system, including a nuclear-electric source of power, may be tested as early as 1965.

Described in an accompanying news-item, this ion engine by Hughes Aircraft develops nearly 0.1lb thrust

MULTI-EXPERIMENT ATLAS LAUNCH

An E-series Atlas ICBM was launched from Cape Canaveral on October 2 in a mission which is likely to prove of exceptional value. The 400,000lb-thrust Atlas E is the most powerful missile at present flying outside the Soviet Union, and the opportunity is being taken in its test-flying of making it carry additional payloads in order to yield valuable data—in some cases completely unconnected with the Atlas programme itself.

The October 2 missile was launched against a designated target 5,000 miles down the Atlantic Missile Range. On the sides of the tapering upper section were attached two pods, each containing an important experiment. The first contained pyrotechnic packages to simulate fuel-element cores which later will be used in nuclear-electric generators for satellites and spacecraft. The intention was that, as the pod re-entered the atmosphere, kinetic heating would destroy the containing envelope and ignite potassium and sodium flares inside. Tracking the trails from the burning flares was expected to yield data on the dispersion of nuclear fuel and radioactive material from SNAP-type generators during re-entry.

In the second pod was mounted the complete airborne guidance system for the Centaur. The subject of a news-item on pages 574-5 (Mariner to use Atlas-Agena B), Centaur has slipped badly during the past year, as reported in *Flight* for September 14 (page 414). On the October 2 flight the new guidance system was not connected to the control system of the Atlas, but its performance was telemetered during flight.

PANDORA

This is reported to be the appellation of an air-to-surface missile under development for use by the British Aircraft Corporation TSR.2 aircraft now being developed for the RAF. Nothing has been divulged officially concerning the existence of such a missile, but this journal's file of Press cuttings has grown rapidly. Most of the reports use the expression "flying bomb," and at least two specifically state that the favoured design specifies ramjet propulsion. It will be remembered that one of the most difficult stipulations in the TSR.2 requirement is that the aircraft (and its weapons) must have the ability to fly at tree-top height at transonic speed, and automatically follow the contours of the terrain.

In one of the most recent comments it is suggested that development of this weapon has ceased, without progressing beyond the feasibility and study stage. It may be recalled that TSR.2 is to have high supersonic performance at altitude, where kinetic heating might preclude the carriage of a missile externally (it is for this reason that the North American B-70 will not be able to carry Skybolt). On the other hand, an extensive range of weapons must be earmarked for the new aircraft, and it is doubtful if any air-to-surface missile of which details are known could be employed without degrading the TSR.2's operational capability. For a missile to be ready in parallel with the aircraft it would have to be a firm development project already.

Missiles and Spaceflight . . .

As described in a news-item on page 575, an X-15 probably experienced skin temperatures of 1,100°F during a high-speed run on September 28. First man to reach the aircraft when it arrived back at Edwards was NASA project physiologist Roger Barnicki, who is shown opening the cockpit (and burning his hands?)

An advanced Polaris A-2 was successfully launched on a full-range mission from the trials ship USS *Compass Island* on October 4. The three previous attempts at launching this extended-range type of missile from the ship were failures.

A correspondent of the *Daily Telegraph* reports that "Russian rockets, either tactical or long-range, appear to be conspicuous by their scarcity in East Germany." He goes on to outline the very modest West German estimates of East German missile strength.

Our US contemporary *Aviation Week* suggests that the "growth-version" of the Minuteman ICBM will be purchased by the US Air Force and is now in full development. The Boeing Company are to submit their proposals by January 1, and the weapon is due to become available "by 1964," in time for it to equip the fifth Minuteman wing.

The second of four Skylark rockets carrying NASA instrumentation was successfully fired from Woomera on the night of October 4-5. The Australian Minister for Supply, Mr A. S. Hulme, said that all the instruments behaved satisfactorily, records of the intensity of ultra-violet radiation being obtained at altitudes from 60 to 120 miles.

It was announced in Washington on September 30 that the US Air Force expect to have 54 ICBMs operational during the coming three months. Already at readiness are 27 Atlas missiles, and the Atlas bases at Fairchild and Forbes AFBs should be operational during the present month and during November, respectively. Moreover, despite protracted labour difficulties, the first squadron of silo-protected Titans at Lowry AFB is also due to become operational before the end of the year.

The high cost of rocket boosters which are lost in flight is of great concern to the US Air Force, according to Maj-Gen Victor R. Haugen, Assistant Deputy Chief of Staff for Development. Deceleration devices such as rotor blades, folding glider wings and parachutes were being studied, the general recently indicated, and considerable study was being given to the development of cheap, expendable boosters. He said that the Air Force is seeking to reduce the cost of boosters by two orders of magnitude eventually, and that it hopes to get them down to about $10 per pound in the future.

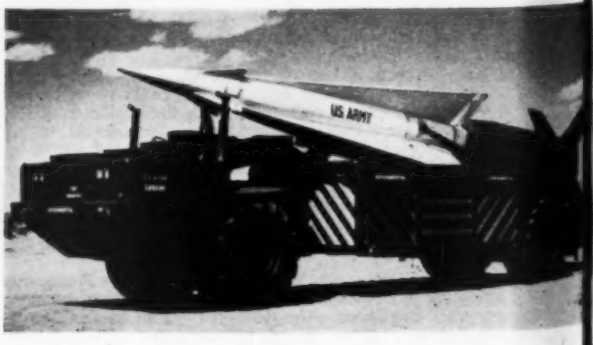
A spokesman for the US Department of Defense states that compatibility tests between GAM-87 Skybolt and the B-52H and Vulcan B.2, and drop-tests of dummy missiles from the former aircraft, have so far proved completely satisfactory. The determination of drop characteristics from the B-52 was carried out at the Air Proving Ground Center range over the Gulf of Mexico; the spokesman adds that "the dummy missile's trajectory provided valuable data." No Vulcan is yet believed to have flown with dummy Skybolts, although a British reader claims to have seen such a combination.

Taken from the second Soviet spaceflight colour film "Again to the Stars," this photograph purports to show Maj Herman Titov immediately after landing from his 25hr in orbit on August 6. As reported in "Flight" for August 17, the second cosmonaut did, in fact, leave his capsule by parachute, unlike Maj Gagarin, who remained inside

Dr Angelo Miele, head of the Astrodynamics and Flight Mechanics Group in Boeing's Scientific Research Laboratories, has published a paper on the applications of Green's theorem to spaceflight problems. He compares the theorem with the indirect methods for linear extremal problems.

According to Admiral George Anderson, the US Chief of Naval Operations, the Soviet Union probably does not yet have a submarine-launched ballistic missile. He said at a recent press conference that, while Soviet submarines which had "certain capabilities for launching missiles" had been observed, these submarines did not appear to be capable of launching their weapons from beneath the surface.

(Left) First picture from Germany to show a Thunderbird of No 36 Guided Weapons Regiment, Royal Artillery, in that country. The unit is now deployed at Sundern Barracks, to reinforce the British Army of the Rhine. (Right) The US Army announced on October 2 the first launching of a Nike Hercules surface-to-air weapon from this new mobile battlefield translauncher. The firing, at White Sands, was completely successful, and promises to release the missile from the fixed emplacements previously necessary



Australia's Domestic Airline Operations

BY STANLEY BROGDEN

THE IATA Annual Conference delegates meeting in Sydney will find the Australian domestic operators recovering from their first setback since the war. The Government-imposed brake on the admittedly inflationary economy in 1960 nevertheless had less effect on the airlines than on most businesses. The falling-off in passenger-lift by both major domestic operators in the financial year 1960-61 (the Australian financial year ends on June 30) was very small. TAA carried 1,044,233 passengers, compared with the previous year's total of 1,080,527, and Ansett-ANA's total was 993,426 instead of 1,003,310.

From what we hear of the fall-off in the USA and over the Atlantic, our operators in Australia would seem to be in a fine situation. Compared with the automobile and other production industries, the airline industry has hardly been affected at all. The main effect was felt in the January-June period, when the final check on the economy made by credit restrictions in November last really had a nationwide result. This has carried over into the current financial year and the recovery is only now becoming apparent.

The Australian airline industry had, of course, been operating under boom conditions in 1959-60—in that financial year the TAA passenger lift went up by 24 per cent. The managements themselves had not expected that bonanza to continue in 1960-61, even without the drastic Government economic interventions in April and November 1960. They knew that the great rise in traffic in 1959-60 was considerably caused by the introduction of new equipment (Friendships, Viscount 800s and Electras) and of tourist seating.

The recession in the past year has had some curious effects. For example, while TAA's passenger-miles total dropped 4 per cent to 510,977,732, Ansett-ANA's total went up 1 per cent to 470,352,172, though Ansett-ANA's number of passenger bookings had dropped. (All these figures are for Australian domestic operations and do not include services to and within Papua-New Guinea, which began during the financial year 1960-61.) In air freight, TAA showed an increase of 3.7 per cent to 37,303,285lb although the fall-off in business in the last six months was very great. Air express cargo showed a spectacular rise of 40.5 per cent to 3,290,797lb.

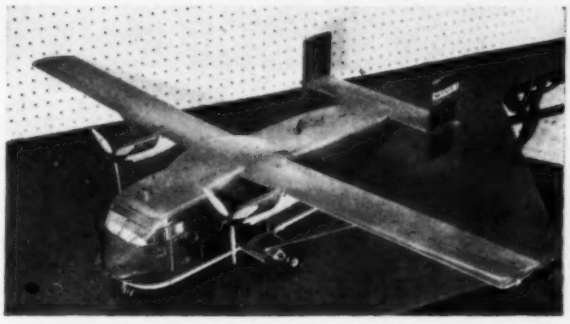
Freight business has been maintained by the change in TAA policy a year or two ago, and by the need for retailers and wholesalers to reduce stocks. Air freight is being used here as a means to keep down inventories in such industries as clothing and home goods. After trailing ANA and Ansett-ANA for many years in air freight, TAA has now decided to go out after this business. TAA now has three DC-3 and two DC-4 freighters on the Australian mainland (three Bristol Freighters in Papua-New Guinea), is in the midst of a big advertising campaign, and is experimenting with basket-type containers as a sort of pallet system. In August TAA opened a new DC-4 freighter service on weekends from Brisbane through Mount Isa to Darwin. Results have been good running north, but on the southbound run cargo has been hard to find. TAA is now trying to secure loading from the growing buffalo-meat industry in the Gulf of Carpentaria country—these are wild buffalo shot in the bush.

Despite the use of specialized DC-3 and DC-4 freighters by both major domestic operators, some 60 per cent to 70 per cent of all air freight carried in this country is lifted by passenger aircraft.

Aviation Traders' Carvair—with which, says Stanley Brogden, Ansett-ANA "has been very impressed"

There will be no big development of the air freight industry from the present annual total of about 65,000 short tons until rates are reduced by around 25 per cent, and that awaits the arrival of new and specialized equipment.

Ansett-ANA has been very impressed by the Carvair DC-4 development and Mr J. L. Watkins recently returned from England full of surprise that the reconstruction has been so successful. There can be no doubt that both the major domestic operators are seriously considering this aircraft. It is not generally known that an Ansett subsidiary in Hong Kong, an engineering firm, has rights for the Carvair. Mr Ansett believes it would be possible for this firm to convert DC-4s for both Ansett-ANA and TAA in Hong Kong, and



TAA has the Short Skyvan under consideration. This SBAC Exhibition model illustrates the Astazou-powered Mk 2 project

to do so more cheaply than in England. The problem with the Argosy is capital cost. As both operators are finding the ex-Pakistani Bristol Freighters a frank godsend in New Guinea (where they are carrying motor cars and other freight into the mountain areas), they must soon consider replacements for 1963 or 1964.

The manner in which the two operators disagree on their solutions to similar problems is always fascinating. A present example is in the North, where both operators have a heavily subsidized outback run in North Queensland and the remote region of the Gulf of Carpentaria. TAA also has a network in the Channel country where Queensland, NSW and South Australia meet.

These services are operated with DC-3s. They are heavily subsidized—the Department of Civil Aviation actually pays out £500,000 a year in direct subsidies to operators for services north of Capricorn. The DC-3 is the wrong equipment. Ansett-ANA has decided to use a Friendship, which will be based at Cairns and also used for a New Guinea run to secure utilization. TAA believes it should offer greater frequency. It wants an aircraft of under 12,500lb so that it can be operated with one-man crew—something rugged, high-wing (an outback necessity) and well-powered to cope with hot weather take-offs. TAA has been very impressed by the Short Skyvan, which is now being put through the system for consideration.

The Australian airline system today is based on the two-operator theory. Ansett-ANA and TAA are to be maintained as the competitive airlines on major, designated routes. These are largely the trunk routes, on which the Department of Civil Aviation (through the Co-ordinator, who is the DGCA, Mr D. G. Anderson) gives its ruling. Hence the apparent lack of equipment competition, for Ansett-ANA and TAA have almost the same fleets. (TAA has three Electras, ten Viscount 700s, two Viscount 800s, nine Friendships, 18 DC-3s, and two DC-6Bs on charter from Ansett-ANA, plus two DC-4 and three DC-3 freighters in Australia, and the Bristol 170s in New Guinea. Ansett-ANA has three Electras, five Viscount 800s, two 700s (plus three on charter from TAA), two Friendships, two DC-6Bs, three Convair 440s, seven DC-3s, plus three DC-4 and three DC-3 freighters, and the Bristol 170s in New Guinea. The fleets of the Ansett subsidiary operators in Australia and New Guinea are not included.)

A decision made in August and coming into operation on October 15 has been for the compulsory splitting of business into Darwin from Brisbane, Sydney and Adelaide. Since 1947, TAA has had this work and Mr Ansett has been urging a cut for years. The Government has now decided to give him half the business right off, though TAA still has the intermediate run up through the

(*Concluded on page 580*)

Swissair's Convair 880Ms in service

BY JOHN STROUD

AFTER a frustrating wait for delivery of its fleet of Convair CV-990 Coronados for use on South Atlantic and Middle and Far East routes, Swissair has commissioned two Convair CV-880-22Ms on its thrice-weekly Zürich-Tokyo services. Operation of these aircraft began on September 10 and they immediately attracted heavy traffic, whereas the DC-6Bs they replaced were being very poorly patronized.

The CV-880Ms, Nos 43 and 45 and registered HB-ICL and HB-ICM, were two of the aircraft originally ordered by Capital Airlines and not taken up when Capital merged with United Air Lines. Invited to fly on Swissair's eastern route, I travelled from Zürich to Bangkok in HB-ICL, boarded it again the next day on its return from Tokyo for the journey to Karachi, and then caught the next service to Zürich, operated by HB-ICM. By chance I also flew the Zürich-London sector in the latter aircraft when it operated the service in place of a Caravelle.

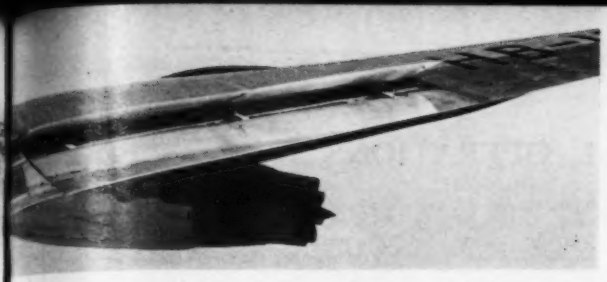
The CV-880M is not completely suitable for eastern-route operation, because some of the sectors are too long; but in spite of this it has quite an impressive performance, as shown by the table opposite. I had not really appreciated the Convair's true size until I flew in it. Really somewhere between the Comet and the big jets, it is essentially a short- to medium-range aircraft, but some of the Swissair eastern sectors are very close to 2,000 nautical miles. In addition, quite strong headwinds are encountered, particularly over the eastern Mediterranean and in the Hong Kong/Manila/Tokyo area.

The Swissair CV-880M has accommodation for 64 economy-class passengers and 20 first-class, with, in addition, a ten-seat lounge which can be used for take-off and landing. The CV-990 will have 74 economy-class seats, and 24 first-class with a four-seat lounge. In both types economy seating is five-across. Though the 880M's interior furnishing and décor is attractive there is no point in describing it here, because it was not produced to Swissair specification.

Swissair use noise-abatement techniques at each place served and at Zürich this meant climbing for four minutes with take-off flap setting and leading-edge slats extended. I found Swissair crews very alive to the need for noise reduction over populated areas.

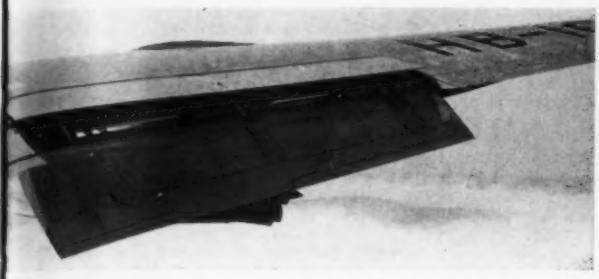
The Convair has a tendency to roll on reaching its maximum height for a given weight but this soon damps out as fuel is burned. Cruise is at constant Mach and the aircraft will climb straight from take-off to best cruise level at full weight in all temperatures encountered. Out of Zürich, which is 1,414ft above sea level, the 880M can operate at full weight (193,000lb) in temperatures as high as 28°C. On the flight I made we could have carried a payload of 24,260lb out of Zürich in the prevailing temperature of 24°C. Swissair's flight-planning is based on fuel to destination plus 6 per cent, with fuel to alternate plus 10,000lb, which is sufficient for an

(Above) HB-ICL, one of Swissair's Convair CV-880Ms at Santacruz Airport, Bombay. (Below) Monsoon cloud over India seen from the Convair at 33,000ft. Much of the flight in this area was made in cloud; the tops of the cu-nim reached to between 45,000ft and 50,000ft



Three stages of let-down: here one of the 880's spoilers is seen raised for the descent (note outboard spoiler bending!)

Leading-edge slats fully open on the approach to Bombay. There are also leading-edge flaps under the centre-section between the inboard engines and the fuselage



The next two stages: above, approach flap, with spoilers slightly raised; below, touching down on the runway with full flap, fully extended spoilers and reverse thrust in operation

hour's holding. In practice the reserves can be increased by reducing power and, if the weather at destination is really marginal, by diverting from cruising altitude.

The aircraft appeared to be very docile and on two occasions its low-level manœuvrability was amply demonstrated when we had wave-offs as we were to begin the final approach. Threshold speed at maximum landing weight of 155,000lb is 142kt. At the weights used on my flights, threshold speed was about 135kt.

These flights were made in monsoon conditions and, although cruising at 31/34,000ft, we spent a considerable amount of time in cloud. Tops appeared to be at around 45/50,000ft but the weather radar enabled comparatively smooth flight to be maintained for most of the time.

The actual performance of the 880M is best judged from the table, which covers each sector flown.

The Swissair CV-880Ms follow different routes between Zürich and Tokyo. The Sunday flight from Zürich goes via Athens, Beirut, Karachi, Bombay, Bangkok and Hong Kong; the Tuesday flight via Geneva, Cairo, Karachi, Bombay, Bangkok and Manila; and the Friday service is by way of Geneva, Cairo, Karachi, Calcutta, Bangkok and Hong Kong.

The total journey distance depends on the route flown, but 8,600 n.m. is a fairly representative figure. Stage lengths vary from 128 n.m., Zürich - Geneva, to 1,969 n.m., Cairo - Karachi—a sector which sometimes necessitates refuelling at Bahrein.

The average scheduled block time from Zürich to Tokyo is 24½hr compared with 45hr taken by the DC-6Bs. The Convair's average airborne time is 19hr. When the Convair CV-990 is in service and modified to achieve its full cruising speed it should be possible to reduce the journey time still further.

Two CV-990 Coronados are now due for delivery in November, certification is expected in December, and Swissair plan to introduce these aircraft from February 1. They will be progressively introduced on the South Atlantic, Middle and Far East routes and when sufficient have been delivered the 880Ms will be returned to General Dynamics. The 990 will eliminate the range problems of the eastern routes and will provide improved payloads. The 880M cannot be used on the South Atlantic services.

SWISSAIR CONVAIR CV-880-22M: ACTUAL PERFORMANCE ZÜRICH - BANGKOK - ZÜRICH

	Zürich - Cairo	Cairo - Karachi	Karachi - Bombay	Bombay - Bangkok	Bangkok - Bombay	Bombay - Karachi	Karachi - Beirut	Beirut - Athens	Athens - Zürich
Stage length (n.m.)	1554	1969	501	1703	1703	503	1836	627	958
Flight plan (hr, min)	3.34	4.21	1.18	3.52	3.38	1.14	3.58	1.36	2.14
Block time (hr, min)	3.39	4.35	1.29	4,10	3.53	1.24	4.18	1.46	2.25
Airborne time (hr, min)	3.31	4.25	1.20	3.56	3.47	1.12	4.03	1.35	2.16
Take-off wt at brake release (lb)	190,000	190,500	160,000	185,000	181,500	165,400	188,600	161,500	175,000
Runway used	34	23	07	27	21R	27	25	21	34
Available length (ft)	11,300	10,100	10,500	9,780	9,150	9,780	10,500	9,600	7,620
Runway elevation (ft)	1,414	311	81	35	12	35	81	86	90
Temperature at take-off (°C)	24	25	32	29	30	27	28	21	17
Distance required to 35ft (ft)	8,694	8,103	6,233	8,000	8,000	6,500	8,000	5,600	5,900
Time to 100kt (sec)	30	29	24	28	27	25	26	23	23
V1 (kt)	140	139	125	136	135	126	138	126	130
VR (kt)	145	144	129	142	139	137	144	130	135
V2 (kt)	156	156	143	154	153	146	156	146	150
Fuel (lb)	72,000	76,000	48,000	77,000	73,100	47,500	75,000	49,000	63,000
Endurance (hr, min)	5.22	6.36	3.40	6.05	5.50	3.30	5.48	3.29	4.21
Commercial load (lb)	21,660	18,331	16,000	11,800	13,400	22,000	16,790	11,350	11,300
Cruise altitude (ft)	29/33,000	34,000	30,000	33/34,000	32/31,000	26,500	31/32,000	31,000	31,000
Cruise level temperature (°C)	—34	—37	—21	—32	—31	—17	—32	—34	—34
Average cruise TAS (kt)	488–496	486–496	505	470	470–495	515	460–480	490	490
Mach No	0.82	0.8/0.82	0.82	0.78	0.78/0.82	0.82	0.78/0.82	0.82	0.82
Wind	—13kt	+5kt	SE 10–15kt	—18kt	+13kt	var. 10kt	+4kt	—35kt	—24kt
Estimated landing weight (lb)	142,000	140,000	140,000	140,000	136,000	144,500	137,000	141,000	144,000
Estimated fuel overhead (lb)	23,100	24,800	28,000	32,000	27,500	26,500	24,300	25,700	31,000
Actual fuel after landing (lb)	24,500	23,700	30,500	31,500	27,000	29,000	24,600	26,400	31,000
Terminal weather	Clear 10 km	Fair	Cloudy, showers	Cloudy, occas thunder	Cloudy, rain	Cloudy	4/8 4,000ft, fine	Fine	Fog breaking up
Alternate	Beirut	Bombay	Karachi	Saigon	Karachi	Bombay	Cairo	Istanbul	Stuttgart/ Frankfurt
Cruise consumption, average (lb/eng/hr)	3,000	2,900	3,100	2,600	0·78: 2,800–2,500 0·82: 3,000	3,400	3,000	3,125	3,125

Notes: Maximum permissible take-off weight for conditions on all stages was maximum gross. Cruise technique for all stages was constant Mach

AUSTRALIA'S DOMESTIC AIRLINE OPERATIONS (continued from page 577)

Centre, calling at the smaller airports. It may surprise English readers to know that Mr Ansett believes this concession will bring him £200,000 more annual *profit* to his combine! TAA is bitter about the decision, for obvious reasons, though there is an hilarious aspect—in 1947 TAA took over the Adelaide - Darwin route from Guinea Airways by Government decision. Guinea was renamed Airlines of South Australia when Mr Ansett took it over! TAA would like compensation in the form of intra-State rights.

TAA has very few intra-State rights; they are mostly in Queensland, where a Labour Government was in control for 30 years until recently. Ansett-ANA has enormous intra-State business through its three subsidiaries, which it absorbed after the Ansett/ANA takeover. In fact, it is a TAA compaint that Ansett-ANA and subsidiaries have 70 per cent of all the business off the main trunk "rationalized" services and that they (TAA) cannot get into it. It appears to Labour supporters—and that Party is explicitly committed by an electoral platform plank to nationalize Ansett-ANA as soon as possible—that the present Liberal/Country Party coalition is slowly working towards emasculating TAA by such decisions as the recent one on Darwin.

Mr Ansett replies that TAA has many advantages. It secures, he says, cheap Government money as required, while he has to pay 10 per cent to his shareholders. TAA gets 75 per cent of all the Government business as well, which he claims is worth £1,000,000 a year preference. He says TAA is permitted to use as capital its superannuation funds, totalling £3,000,000, as a source of cheap finance. And TAA does not need to insure its aircraft, as it is a Government organization. That, argues Mr Ansett, means £400,000 a year.

He wants these things rectified and he also wants heavy Government commitments for a period of ten years or more to the two-operator policy. It is understood the Government is considering legislation which will give him this guarantee, making the omelette very difficult to unscramble when Labour finally achieves power. He also wants half the Government business, which means State as well as Federal. He requires, too, an undertaking that no Government will use airport charges and fuel tax as an anti-Ansett weapon. He is well on the way to getting all these things, which would transform his position.

At the moment Mr Ansett's organization (Ansett-ANA is only a member-company of the Ansett Transport Industries Ltd group) is paying off £2,500,000 a year of the re-equipment costs undertaken over the past four years with Electras, Viscounts and Friendships. I understand that Mr Ansett will place his first order for jets late next year: he tells me the Boeing 727 is preferred right now, but with the Trident well in the picture. He says the big fellows will be ordered first, about 18-24 months ahead of the smaller type, which he thinks will be the BAC One-Eleven at this stage.

This rather reverses previous thinking, which would have placed the smaller jet first: but both operators want to introduce jets under the most favourable circumstances. The big jets are intended to replace the Electras on trunk routes, while the One-Eleven comes on instead of the Viscount. They would be delivered around 1965, when Tullamarine's first runway for Melbourne's new jet airport might be completed.

Thinking is for two 727s or Tridents or Caravelle 7s for each of the big domestic operators, plus a fleet of eight to 12 One-Elevens. The latter would start coming into Australia 18 months or so after the big fellows, for the Viscount routes. Ansett-ANA, incidentally, liked the Baby Caravelle idea very much, but not the Caravelle 7.

A more immediate problem for the operators here is a DC-3 replacement. DCA is mad keen to get the DC-3s off the passenger runs in the Outback and feeder services. The Super-Broussard is just what they need, but it never seems to get any further ahead. DCA has given the operators full warning that as soon as any DC-3 replacement is available they must order it for the soonest possible operation.

At this moment, however, the operators are watching statistics with the keenest interest to pick up signs of a recovery. The Australian economy has settled down again and is showing all the signs of recovery, and the second half of this present financial year should see a reasonable rise in airline business. It is possible that the 3,000,000-passenger mark might be reached in 1961-62 for the first time in Australian aviation history. As the population is 10,500,000, nobody can say Australians are not air-minded.

Australian domestic operators all show a profit, whether they are receiving Government subsidy or not. The reduced business for 1960-61 has reduced profit, but there still is a profit reported by all operators, including the Government operator, TAA. This is not a universal result in the world's airline industry, and it shows the strength of the industry here. It also demonstrates the wisdom of the Government policy of having two major domestic operators, with a small number of intra-State operators.

Vintage Twin

"FLIGHT" TRIES A MONOSPAR ST-12

FLYING a Monospar is rather like stepping back into the 1930s. On the instrument panel is a notice which says: "Designed and manufactured by General Aircraft Ltd, London Airport, Croydon"; and the control column, mounted centrally, has the type of circular hand-grip (designed to swing over for use from either seat) you might have encountered in pre-war airliners.

It was a pity that, with Croydon no longer operative, VH-UTH, the Monospar ST-12 which Dr John Morris and Mr Bruce Harrison had flown from Australia (*Flight* last week, page 559), could not go into its original home; but from Biggin Hill, to which they brought it from Lympne, where their flight had ended on September 30, the aircraft could at least sniff the air of its native county.

With Dr Morris as mentor (Mr Harrison, who runs a Sydney electrical business, had been responsible for maintenance *en route*) we had an opportunity of flying this vintage (*circa* 1934) aircraft, which is now offered for sale in the UK. Its long (120hr) flight from Australia recommends it for reliability; it also survived tremendous monsoon rains at Akyab. Structurally, the all-metal Monospar is very strong. From the handling point of view, it has certain peculiarities at first acquaintance; but from then on, according to Dr Morris, "a real love affair develops."

The cockpit is simple. There is a handbrake by the left-hand pilot's seat, and differential braking is effected by the rudder pedals. The throttles, which are very close to the side of the cockpit, are duplicated; elevator trim is available only from the left-hand side. Ignition switches, blind-flying instruments and oil pressure and temperature gauges are all on an instrument panel so far away in the nose of the aircraft that only a man with long arms can reach the ignition switches. (Dr Morris had a special modification for re-setting his directional gyro: a tubular metal rod with incisions at its end which impinge on a cross-piece fitted to the knob of the instrument.) The main fuel cock is between the seats; and there are differential cocks (small yellow knobs) on the floor in front of each seat, where one has to be careful not to move them inadvertently. Normal fuel capacity is 55gal, giving 4½ hours' endurance; with a 30gal overload tank installed in the fuselage for the trip from Australia, endurance is 6½hr. Priming and starting are done externally, the latter by hand swinging; Dr Morris has had a duplicate set of ignition switches installed in the nose of the aircraft.

The Monospar is easy to taxi, once one is used to the slight lag in response on opening up the Gipsy Major 1s; forward and downward visibility from the side windows in the pointed nose is good. This helps on take-off, which involves no snags except that rudder needs to be applied quite strongly in the early stages to keep the aircraft straight, while the control column has to be pushed right forward to bring the tail up.

VH-UTH came off the ground at about 60 m.p.h. and showed an excellent initial rate of climb, at about 80 m.p.h. i.a.s. We settled down to a cruising speed of 110 m.p.h. at 2,100 r.p.m. and the aircraft was trimmed to fly hands-off in what were exceptionally calm conditions. Turns are quite a strange experience at first in what is, comparatively, a small aeroplane; a good deal of rudder is needed, and when a normal amount is applied initially there seems to be little effect. The tendency is then to apply more, when suddenly the effect is felt quite forcibly and the Monospar winds steeply into its turn. In this slowness of initial aileron response it rather reminds one of the Wellington. At low altitudes, of course, this is a characteristic which needs watching. At the stall, which occurs at just about 50 m.p.h., the Monospar seems to have no reprehensible characteristics. When a pilot is used to handling it, as Dr Morris showed, the aircraft can be flown quite energetically.

Landing procedure is simple: as the undercarriage is fixed and there are no flaps, the only thing one has to do is throttle back. The recommended approach speed is 80 m.p.h. and the aircraft can be either wheeled-on or three-pointed. Landing on Runway 21 at Biggin Hill it was slightly gusty near the ground and an appreciable amount of aileron movement was required, due to the slowness of response already mentioned. After touchdown there seemed to be no tendency to swing.

The Monospar is a roomy four-seater, with space for baggage between pilots and passengers. (In VH-UTH, part of this space is taken up by the overload fuel tank.) Full night-flying equipment is fitted. There is a Bendix MN26 five-channel HF Skyranger transceiver set and a four-channel VHF; there is also a Bendix radio compass with manual loop. The wings fold, which facilitates hangarage. Dr Morris is hoping, after settling Customs dues, to clear £1,000 on the ultimate sale.

H. W.

without delay

At over 200 miles an hour direct to your destination. No timetables. No time-wasting journeys to or from major airports.

The de Havilland Dove 8

(Gipsy Queen 70 Mk. 3 400 b.h.p. engines)

Ready to carry six passengers and crew 600 miles non-stop. With four passengers the range is increased to 950 miles. Modern business demands modern travel — The Dove 8 provides it.

HAWKER SIDDELEY AVIATION

32 Duke Street, St. James's, London S.W.1

BRISTOL/FERRANTI

BLOODHOUND MAR

CHOSEN BY SWEDEN & SWITZERLAND

BRISTOL AIRCRAFT LTD FILTON HOUSE BRISTOL A Company of

BRITISH AIRCRAFT CO

ONE HUNDRED PALL MALL LONDON SW1

LANENTIRELY ON TECHNICAL MERIT

In open competition with the best weapon systems available in the West, and strictly on technical and operational merit, the Bristol/ Ferranti Bloodhound Mark 2 has been chosen by Sweden and Switzerland. This powerful, accurate and air-transportable weapon system has also been ordered by the Royal Air Force as the basis of Britain's anti-aircraft defence.

Bloodhound Mark 2 is a second-generation missile system and is the logical development from Bloodhound Mark I.

Bloodhound Mark 2 has:

- **Long range**
- **High and low altitude coverage**
- **Extended performance in all aspects of anti-aircraft defence**
- **Latest anti-jamming techniques and the most advanced C.W. radar. (Supplied by Associated Electrical Industries Ltd., who will be responsible for all tracking and illuminating radar for Switzerland).**

Bloodhound system management by Bristol Aircraft Ltd. Radars and electronics by A.E.I. Ltd and Ferranti Ltd

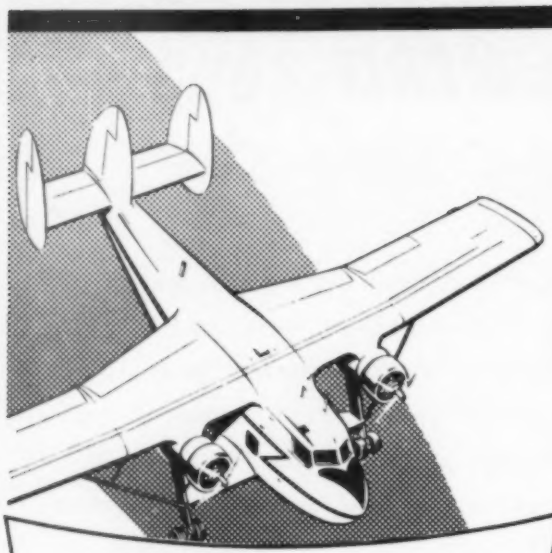
BRISTOL/FERRANTI

BLOODHOUND

MARK 2

FCORPORATION

BBW.5A

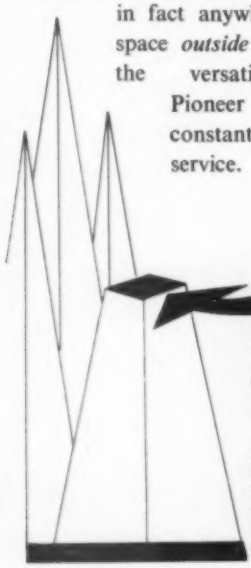


for LIMITED SPACE OPERATION

The Twin Pioneer 3

(2 ALVIS LEONIDES ENGINES)

From jungle airstrips in the Far East, oil sites in the Middle East and Africa or narrow mountain valleys in Austria and Switzerland, in fact anywhere where space *outside* is limited, the versatile Twin Pioneer is giving constant, economic service.



FROM A TAKE-OFF RUN OF 420 feet

THE TWIN PIONEER 3 WILL CARRY 16 PASSENGERS

OR 4,000 POUNDS FREIGHT
OR 2 LARGE SURVEY CAMERAS
OR 9 STRETCHER CASES
OR 12 PARATROOPERS
OR 4 x 500 POUND BOMBS
OR MANY OTHER CIVIL AND MILITARY LOADS

DESIGNED & MANUFACTURED BY
SCOTTISH AVIATION LIMITED
PRESTWICK AIRPORT, SCOTLAND

ENGLISH ELECTRIC
AVIATION LIMITED

Require an

Air Traffic Control Officer

Applications are invited from qualified Air Traffic Control Officers to fill a vacancy which has occurred at the Company Airfield, Warton, Lancashire; adjacent to Lytham St. Annes and the modern amenities of Blackpool.

Applicants should be in possession of the M.O.A. Air Traffic Controller's Licence or in a position to qualify with a minimum of delay. A wide knowledge of Air Traffic Control is required coupled with practical experience of control using surveillance/aerodrome radar and associated approach control equipment. Aircrew experience and a knowledge of the control of high-speed jet aircraft would be an advantage.

The appointment is permanent and pensionable and an attractive salary is offered commensurate with age, qualifications and experience.

Write in confidence to:

J. G. Coop, Room 206/F
English Electric Aviation Limited
Warton Aerodrome, Near Preston
Lancashire

A COMPANY OF
BRITISH AIRCRAFT CORPORATION

SERVES TODAY'S AND TOMORROW'S AIRCRAFT

Contact Sensing Switch for surface temperature control or warning

Modern commercial and military aircraft are becoming more and more complicated and greater responsibility is undertaken by automatically operated switches. Engel & Gibbs manufacture thermal and levelling switches to meet these requirements.

Thermal switches.
Applications include:-
Invertors, Alternators, Generators, Fluid Drives, Quartz Crystal Ovens of Radio Transmitters, De-icing, low temperature detection, windscreen de-misting, electric motor protection, etc.

Levelling switches
for Gyro Units used in Automatic Pilots and Artificial Horizons.

Equipment such as this is fitted to the Trident, VC10 Vanguard, Argosy, Avro 748, Fairy Gannet, etc.

Overtemperature Switch suitable for Invertors, Alternators, Generators, etc.

Air Sensing Switch for duct temperature sensing

Please write for full information:

Engel & Gibbs Ltd.

Elstree Way, Boreham Wood, Herts. Telephone ELStree 2291-4

Left to right: the old Empire flying-boat signpost at Sydney, NSW; The TEAL sign at Auckland, NZ; and the Qantas sign at Rose Bay, Sydney

SIGNS OF THE TIMES

BY LESLIE HUNT

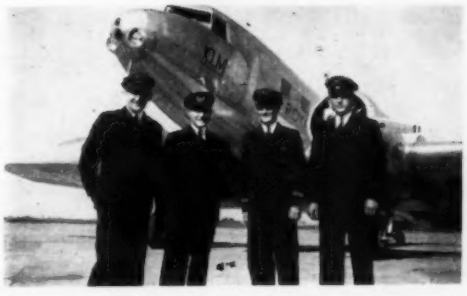
EARLY this year a plaque and beacon were unveiled on the island of Taveuni, in the Fiji Group. It marks the only significant land-mass in the Pacific through which the 180th meridian passes. The beacon is certain to attract thousands of tourists anxious to photograph their relatives and friends with one foot in "yesterday" and one in "today." For Fijians, by the way, a proclamation has stated that the date to the west of the International Date Line is now to be adopted as standard throughout the Fiji Group.

Whether or not you will have sufficient time to leave your aircraft and take a snap of this unique beacon, there are still many out-of-the-ordinary signs to be found in different parts of the world. Several actually sited at airports are available to keen photographers during halts; others—in towns and cities—require at least an overnight stop if one is to add them to a collection.

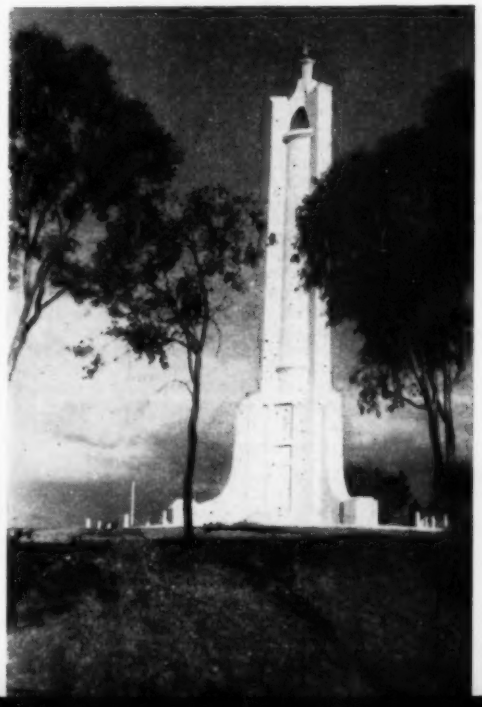
Let us begin with Auckland—not that we are covering the world alphabetically, but because here a most informative signpost indicates (or did when I saw it last, in 1954) not only such points as London, Rome, Cairo, Sydney and Calcutta, but also the romantic-sounding Apia, Papeete, Aitutaki, Tonga, and Suva on the "Coral route." I hope the sign still remains; it stood beside four "grounded" flying-boats which (I later heard) were sold at an enormous loss when land planes took over the New Zealand - Australia services. However, outside Auckland is preserved an historic military milepost, so it is to be hoped that the authorities will also see to it that routes pioneered by Sir Charles Kingsford Smith and Capt Sir Gordon Taylor are perpetuated by making this sign a permanent part of New Zealand's history.

Sir Gordon Taylor—who won the only George Cross (then the EGM) ever gained in a civil aircraft—initiated Pacific "cruises" in a Short Sandringham and now keeps a fleet of yachts and skiffs at his Pittwater home on Broken Bay, north of Sydney. Only a short distance away in Rose Bay, where I snapped an old Empire flying-boat sign and a more recent Qantas Empire Airways post. Yet, when I boarded a Hythe for a trip to Queensland, it was not one of the legendary firms which operated the flying-boats, but Ansett Airways. *En route* to Brisbane we touched down at Grafton, NSW, and Southport, Queensland, before finally landing at Redland Bay—thus proving that Australia certainly has the rivers and harbours for the "boats." My day aboard the *Tahiti Star* was memorable, even though we did not visit the glamorous islands beyond Australia.

Australia—perhaps the world's most air-minded country—can show a beautiful war memorial that is one of the all-too-few practical tributes to the dead. Those who recall the great England - Australia Air Race of 1934, won by the Comet Racer, will remember that the DC-2 entered by KLM and piloted by Parmentier and Moll, was in hot pursuit of Scott and Campbell-Black on the final leg, but in the darkness, failed to find Melbourne and circled the Victoria - NSW border until a band of motorists at Albury rushed



The war memorial beacon at Albury, NSW, stands near the spot where the crew (above) of the KLM DC-2 made a forced landing during the England - Australia Race but went on to win the handicap section



Above, four-language (English, Malay, Tamil, Chinese) sign at RAF Tengah, Singapore. Right, the "Cross-roads of the Pacific" sign in Hawaii

Below: as yet imaginary—a "TCA Vanguard" signpost

Signs of the Times . . .

Famous name for a Transport Command Britannia

to the racecourse and, with a "headlamp flarepath," enabled the DC-2 to make a safe landing. So, when a suitable war memorial was under discussion, this lovely beacon was erected above Albury, to lighten the darkness for future airmen; a practical monument indeed.

Re-tracing the route of the D.H.88's victorious flight we land at Singapore; and, if we happen to use RAF Tengah, one of the first signs to greet us (see picture) makes it very clear that we are in an area where a miniature United Nations pulls together to see that aircraft, crews and passengers are refreshed for their onward journey.

If we now fly via Hong Kong and Japan *en route* to North America, what better spot to visit than Hawaii, scene of the great "Dole Derby" of 1927 in which the world's finest aviators flew? Today the famous pineapple identifies the Dole factories; and emphasizing its position as "the cross-roads of the Pacific" a really detailed signpost awaits photographers at Kau Kau Corner.

Once in the United States we expect to find even our signposts right up to date and, sure enough, as we drive from airports into cities, the roadside not only offers boards saying "Radar Ahead" but others giving the warning "Speeds Checked by Air Patrols."

Covers of the "glossies" (including *Flight*) have shown us Canada's preference for the products of Vickers-Armstrongs (Aircraft) Ltd; and it is with that company's permission that I reproduce part of Clive Uptton's well-known painting. Failing to pinpoint the signpost, though feeling it must be near Montreal, I appealed to Trans-Canada Air Lines—and it would seem that it is a case of artistic licence. But perhaps TCA *will* now erect a post or two!

Crossing the Atlantic to complete our circuit in search of signs we may—if in the capable hands of RAF Transport Command—terminate our trip at Lyneham, Wilts; and, if so, let us not depart until we have noted those other signs, so precious to navigators over many years. On the noses of the Comets of No 216 Sqn and the Britannias of 99 Sqn are painted the names of stars and constellations (on the suggestion of Air Cdre R. E. Craven, when he was group captain commanding Lyneham). What a happy thought that the name *Canopus*—made famous by the Imperial Airways flying-boat—should now ride the skies again on a Britannia.

Canopus was, after Sirius, the most brilliant star but one in the celestial vault, but was later surpassed by Eta Argus. The Argo constellation is situated in the southern celestial hemisphere where, of course the Southern Cross gave its name to civil aviation's grand old Fokker, now resting at Eagle Farm, Brisbane.

In an age when enthusiasts are keenly exploring the possibilities of collecting veteran aircraft for museums, it is pleasant to think that there are links with aviation—in the shape of signs and signposts—which ought not to be "collected" but maintained for posterity where they were first erected. The harbours may be closed to flying-boats, earlier small fields to aeroplanes; but let us take a lead from New Zealand, and see that any remaining signposts become the landmarks which future generations will venerate, as the links with the days of the biplane and the piston-engine.

If readers will be so kind as to send (either for publication in *Flight's* correspondence columns, or to me c/o the editor) details of any aviation signs and signposts I have not mentioned, the keen, the curious, and the compiler will be most grateful.

SPACE EXHIBITION AT OLYMPIA

AN international exhibition devoted to space research and technology and sponsored by the British Interplanetary Society is to be held at Olympia, London, from May 2 to 11, 1962. It will be organized in conjunction with the Power Generation Exhibition which will take place at the same time. The aim of the space exhibition, the BIS state, is to bring together manufacturers from both Britain and other countries to show the industrial potential of space technology. A full range of space activities will be illustrated, with particular emphasis on propulsion and electronics and their application in both manned and unmanned space research. In connection with the exhibition, which will be largely technical in scope, a series of lectures, demonstrations and films is being arranged.

SMITH'S REAR-VIEW PERISCOPE

IN our issue of September 14 we illustrated the rear-viewing periscope which is to be fitted to the VC10 to allow the crew to inspect the rear of the aircraft. On that occasion it was not mentioned that this periscope is being supplied by Smiths Aviation Division.

FORTHCOMING EVENTS

Oct	12	RAeS (main lecture at Isle of Wight Branch): "Experience in Constructing and Flying Bell's Recent VTO Aircraft," by J. O'Malley Jr.
Oct	12	Guild of Air Pilots and Air Navigators: Lecture, "Stress and Human Performance," by Air Cdre W. K. Stewart.
Oct	12	Radar and Electronics Association: "Space Communications" (Part I). "Systems and Equipment," by L. F. Mathews.
Oct	16	RAeS Astronautics and Guided Flight Section: "Packaged Liquid Rocket Propulsion Systems," by W. N. Neat and K. G. Page.
Oct	18	Kronfeld Club: "Indian Expedition," by Dr Brennig James.
Oct	19	RAeS: Fifth Lanchester Memorial Lecture, "From Ship-accompanying Waves to Shock Waves of Supersonic Aeroplanes," by R. Legendre.
Oct	23-24	International Airline Navigators Council: European Regional Meeting, Paris.
Oct	25	Kronfeld Club Annual General Meeting.
Oct	25	Society of Enviromental Engineers: "Structures and Components at Elevated Temperatures," by A. M. P. Brookes.
Oct	30	RAeS Historical Group: Lecture by Sir Frederick Handley Page.
Nov	1	Royal United Service Institution: "Thoughts on the Nuclear Deterrent," by Marshal of the Royal Air Force Sir Dermot Boyle
Nov	3	RAeS Rotorcraft Section: "Electronic Flight Information Displays for the Rotary-wing Aircraft," by Wg Cdr J. C. G. Bell.

RAeS Branch Fixtures (to Oct 19): Oct 18, Manchester, "Target Aircraft," by D. V. Moore.

AIRSTRIP AIRLINE

Mountain Flying with Basutair

THE light aircraft was bumping along the makeshift rough airstrip at 40 knots. Straight ahead a soaring cliff loomed faster and faster towards us as our own speed increased. I shut my eyes, awaiting the inevitable—only to feel a tremendous lift as we cleared the cliff-top by a matter of feet.

Such an experience is a familiar one to the three pilots who fly for Basutair (Pty) Ltd in Basutoland, one of Africa's most mountainous territories. Every day these men fly their human and other cargoes to some of the most isolated spots in the Commonwealth. They land at one or more of the 24 airstrips in the country, none less than 6,000ft a.s.l. Each strip is a challenge to any experienced pilot; cross-winds occur on many afternoons, the strips are short, and they are often situated on top of 9,000ft-high peaks. Last year these three pilots made 4,780 flights in about 300 days—more than 400 a month or ten a day—landing on strips pretty nearly as rough as ploughland. Besides these, there are several strips near trout pools high in the mountains. Landing at one of them, even in the best of conditions, is a shaker for any pilot—literally as well as figuratively.

Some strips run uphill, others down; they are covered with snow early in winter. Of all the airfields used in this country, about the size of Belgium and with only 12 per cent of its surface arable, only one is an airfield in the modern sense of the word—that at Maseru, the capital.

The three pilots—Don Cash (ex-RAF), Hector Voss and Theo Truter (both ex-SAAF)—seldom fly below 8,000ft. A few miles from Maseru the minimum is well above that; here the safe operational height is around 15,000ft. To fly lower would be to invite catastrophe among the ragged peaks of the Drakensberg, which, with its foothills covers more than one-third of the territory. During winter the mountains are covered for as long as three months with snow. Then even the hardy herdsmen leave the highlands, and the territory becomes the most desolate in Africa to fly over.

The freight which these pilots and their machines—Dornier Do27s and Piper Tri-Pacers—fly into the hinterland is as varied as the strips they land on. It ranges from X-ray equipment for isolated mission hospitals to live poultry for inland traders. Some months ago a tractor was flown-in piece by piece to be assembled by a priest at the airstrip. Shortly after that followed a 6ft-tall statue of Christ for a church. Smaller items include sewing machines, bales of barbed wire and even live pigs.

The pilots are often called on to do rescue work. Some years ago the managing director and chief pilot, Dick Southworth, had to land in a snow-covered glen to fly out another pilot who had crashed the previous afternoon, breaking both legs. The fractures were set in the early hours of the morning by a mission doctor and Southworth landed in blustery conditions to fly the injured man out.

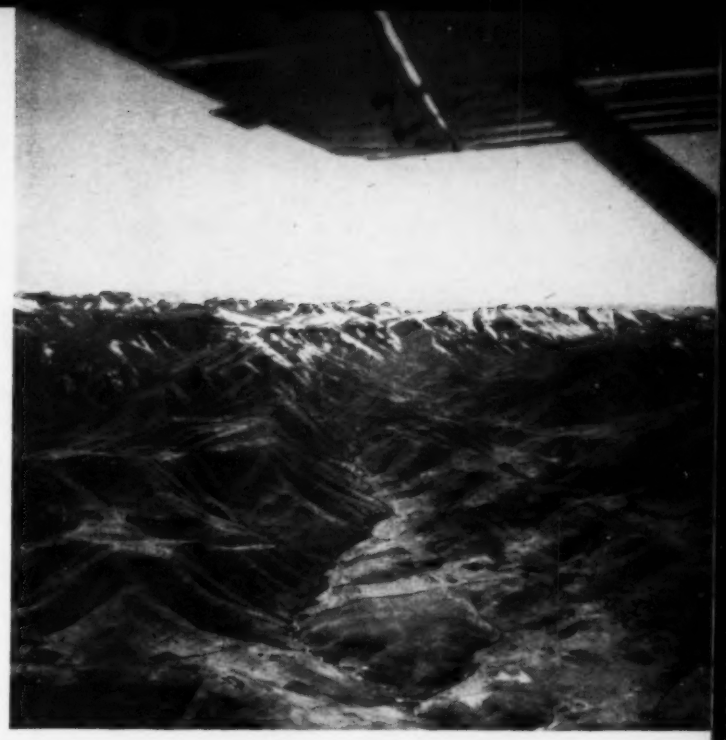
Serious medical cases are now seldom moved along the tortuous horse trails that cross the awe-inspiring heights. Relatives of patients usually go to the nearest mission station and ask for the patient to be flown out. The missionaries pass on to Basutair by radio the exact position of his village, and the pilots pinpoint the position on their large-scale maps and try to determine whether they could land or not. If there is the slightest possibility an aircraft is soon on its way while the villagers, assisted by the missionaries, prepare a hasty airstrip.

The Basuto have taken to flying more than other native people I have come across in Africa. The Dorniers can carry six passengers, and they are always fully booked. Mineworkers fly to recruiting stations; herd boys going to school for the first time—at the age of fifteen—leave their lonely villages from the nearest airstrip for the outside world. They all accept aircraft with the nonchalance which Africans accept anything new.

This is certainly the most dangerous "bush-flying"—if it can be termed that, for there are hardly any trees in Basutoland—in Africa. Recently a young pilot who had just joined Basutair, and was flying with his newly wedded bride, flew into one of the treacherous peaks. The wreckage of the aircraft, and the bodies, was found days later by rescue parties. Other crashes have had happier endings. Pilot Hector Voss last year flew with five African passengers from Mokhotlong, almost 11,000ft a.s.l., to Maseru. Engine trouble developed when he was miles from the nearest strip, and a film of oil was blown across his windscreen. He landed in a clearing near some huts, on roughly ploughed maize land. Not a single injury resulted. Spare parts were flown to the damaged aircraft and it was flown out some weeks later. Within two hours of the forced landing Voss was flying again, from another airstrip back to Maseru.

To fly with these pilots is an unforgettable experience. Their intimate knowledge of the territory with its baffling landmarks is amazing; they inspire the greatest confidence, and one feels that their flying skill could hardly be surpassed anywhere in the world.

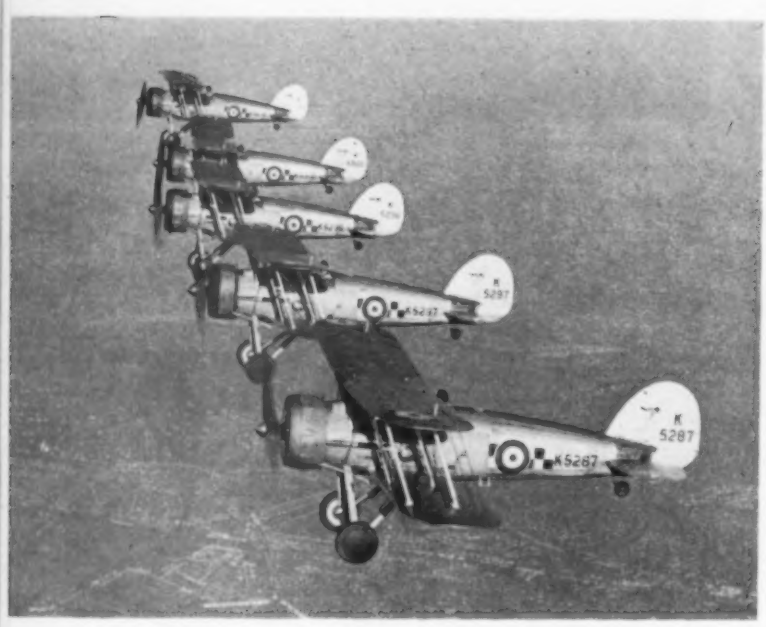
C. J. Uys



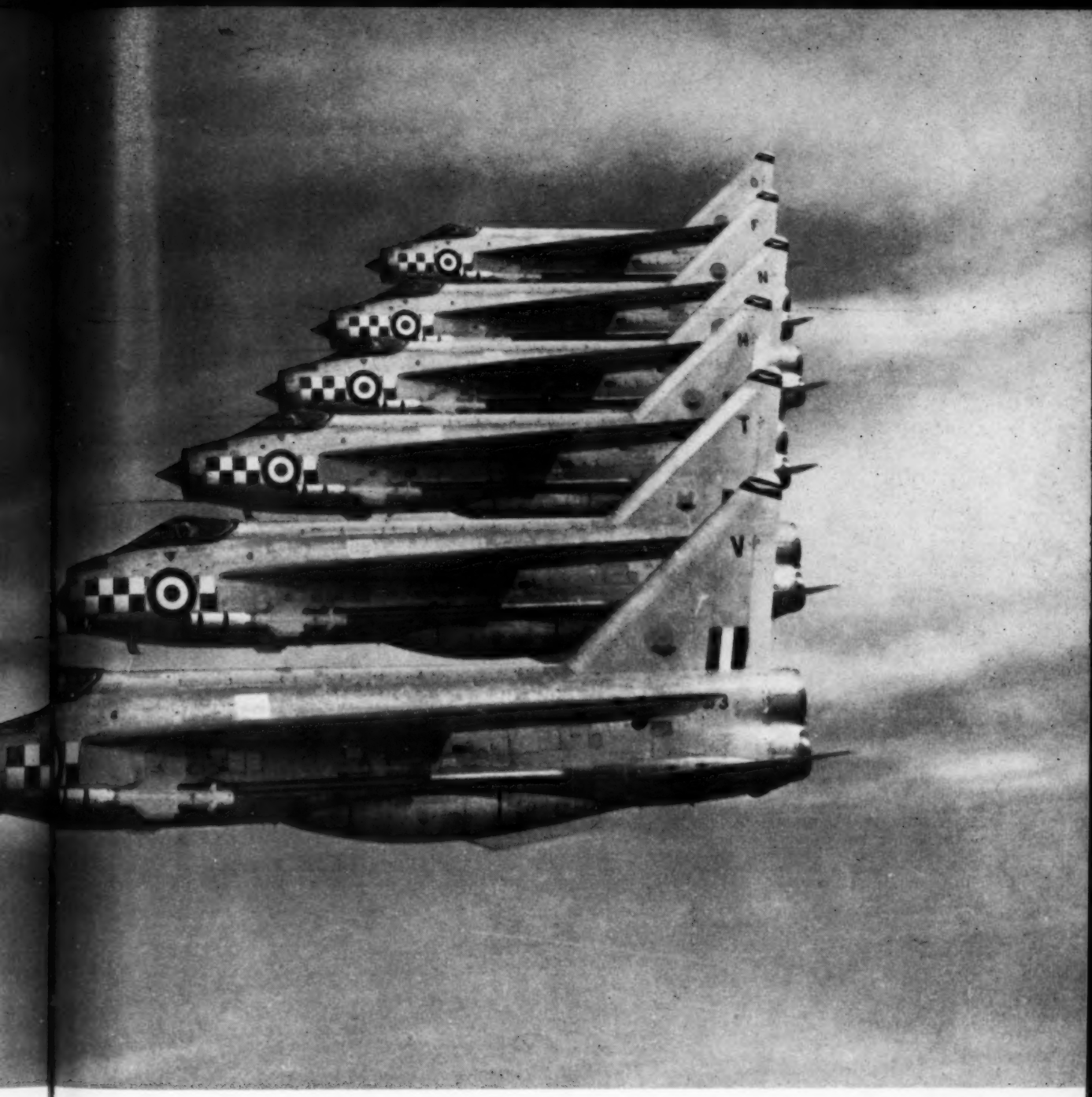
Typical scenery, seen from a Tri-Pacer, on the inter-airstrip routes. Below, while a Do27 is refuelled, native passengers wait to go aboard

Pilot Theo Truter alongside a Do27; being loaded is a cargo of barbed-wire reels. Right, the Basutoland strips are seldom level

The Chequered Years



DICING is the term sometimes used to describe the red-and-wh[ite] mark[ings] these days, however, the word has a Service connotation which [is] now involved. Be that as it may, these pictures illustrate a rem[arkable] in common. The progression begins with the view of the Brist[ol] early 1930s, until it was replaced by the Gloster Gauntlet; five [of] example of which (though not in 56 Sqn markings) is observ[ed] the picture above, is, of course, the English Electric Lightning F[1]



d-and-wh[illegible]urd markings displayed on the aircraft of No 56 Sqn, RAF Fighter Command. In
ion which [illegible]patible with the rigidly disciplined, and highly technical, operational techniques
ate a rem[illegible]rical sequence in British fighter development—all of them having 56 Sqn markings
the Brist[illegible] the ground at lower left. This famous fighter formed the equipment of 56 Sqn in the
tlet; five [illegible]per left. The Gauntlet, in turn, was superseded by the Gladiator, the surviving
is observ[illegible]y with the Bulldog. The squadron's present equipment, portrayed so strikingly in
ghtning F

ITALIAN ADVENTURE

By PHILIP WILLS

THE "leg" of Italy consists, as everyone knows, of a mountain chain—the Appenines—running NW/SE for around 500 miles, shading down to the sea on each side; the distance from coast to coast is only around 100 miles. As a piece of geography, this is very similar to the layout of New Zealand, but the effect on the circumambient air bears it no relation at all.

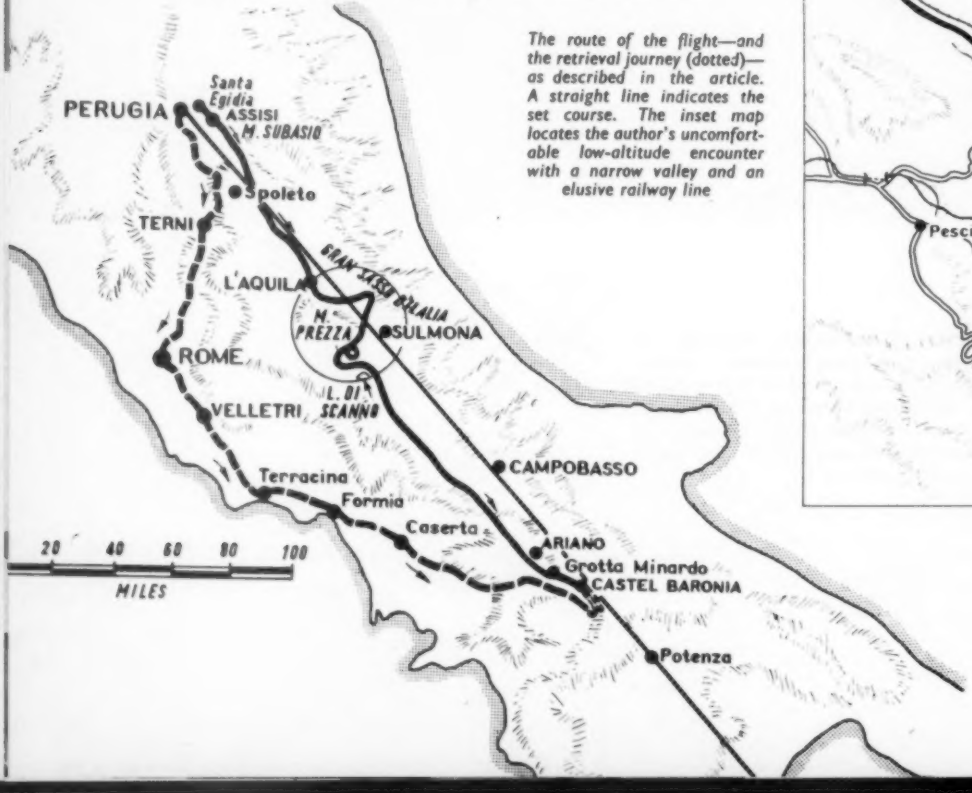
Whereas the behavour of New Zealand air is dominated by the fact that the island lies athwart a prevailing wind coming over a thousand miles of unrestricted sea, Italian air is profoundly affected by the fact that the peninsular is walled off to the north by the 600-mile long chain of the Alps, towering up to 10,000ft and more, obstructing the drift of weather from the north.

After a month in Italy in August I am in no position to generalize, but at least for that time we lived in a relatively stagnant pool of warm, descending, anticyclonic air, so that instead of the predominantly wave conditions of New Zealand, we had air which in the ordinary way would have been most reluctant to rise. But the clue to the extraordinarily interesting flying we actually got lay in the fact that the peninsular is almost a perfect machine for the production of sea breezes. As the mountains heat up each day, these build up and blow inland from either coast, and the mountain slopes facing the sun produce variations of heating which, as the critical surface temperature is reached, force the most reluctantly stable air to rise in glorious thermals, blue at first, then high enough for cumulus to form over the mountains. Eventually, over the highest mountains on several days we had splendid cumulo-nimbus, base safely above the mountain tops, lift inside smooth and fast and wide, icing level perhaps 15,000ft, tops on one occasion over 25,000ft.

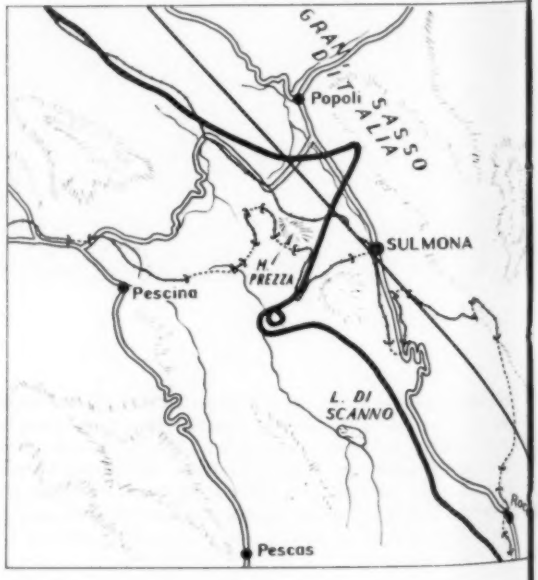
As for conditions on the ground, the contrast with New Zealand is of course just as complete; for whilst New Zealand is sparsely populated and has only been civilized (in the full sense of the word) for 100 years, Italy is densely populated and has for over 2,000 years been the seat of one of the most sophisticated civilizations the world has known. The effect on one who, like myself, was visiting it for the first time is overwhelming. There is so much to see, so much history and beauty in the smallest village, that I found myself giving up the effort to take it in in detail. Cut off by the language barrier—for, alas, none of us spoke Italian—I just metaphorically lay back and tried to let the whole think sink in as an atmosphere, a background for living. And I am sure that, in a fortnight's gliding, landing in out-of-the-way villages, struggling with the telephone system (oh dear!) and the friendly carabinieri and peasants and people, and motoring some 2,000 miles over the (mostly good) tortuous and precipitous roads, far away from the normal tracks of the tourists, we got a little nearer the heart of Italy—but still how far away!—than does the average visitor.

One clue to the Italian character lies in the fact that, in the Middle Ages, every Italian town and village had to be in some sense a fortress, hence a very large number are perched on the tops of steep and precipitous hills. How they arranged their water supply I don't know, probably they needed far less water in those days than we can imagine. But with the coming of the 20th century, and the need for water, road and rail communications and the like, a very high standard of civil engineering became essential. We saw many of the ancient marvels of Rome, Venice and elsewhere, but one of the most abiding memories of the wonders we saw was the incredible new road just opened from Florence, north across the mountains to Bologna. This fantastic highway runs for 60 miles and more, either suspended in space on viaducts and embankments or else diving through mountainsides in tunnels. It is one product of a race of engineering giants, fit successors to the creators of the vast architectural wonders of Rome.

The modern system of *autostrade*, now under construction, will revolutionize communication in Italy, because they adopt the simple basic plan of running relatively straight and flat along the valleys, with spurs going off on each side to each mountain-top town. But the existing road-system does the reverse. Our Skylark's trailer is some 30ft long, and weighs around three-quarters of a ton. One would be motoring home at night, after a cross-country flight, along a valley with the mountains looming faintly around against the stars. A new cluster of stars would appear high ahead. A little later a faint black hump would loom and reach up to it, and one knew it was a village. A mile or so later and the road would start to climb, turning and doubling back like a tortured animal. On and up we would go, in third, second and bottom gear, endlessly climbing and twisting, until at last the stars became lights, narrow streets would close in around us, the front windows of each house looking down on us and across at its opposite neighbour a few yards



The route of the flight—and the retrieval journey (dotted)—as described in the article. A straight line indicates the set course. The inset map locates the author's uncomfortable low-altitude encounter with a narrow valley and an elusive railway line



"Little could St Francis have dreamed that his monastery and the adjacent town would in the 20th century produce the ideal starting point for Icarus in real life; for, baking in the sun, Assisi produced a permanent thermal in which each morning we were launched by aero-tow"

away, but the back looking out over the wide expanses of the whole earth. Then we would be through, and the road would once more be writhing down in its tortuous descent to the world below, the next valley, and the next mountain.

Gliding championships in Italy, therefore, present not only the most fascinating and beautiful flying for the pilot, but also the most arduous test for retrieving-teams and equipment. For road distances are up to *double* air distances, and average speeds of around 25 m.p.h. with the trailer are as much as can be achieved. Thus a flight of 100 miles may involve 400miles for the retrieving team, in great heat by day, and it will be at least 16hr, if all goes well, before the pilot and crew will reach home.

The longest flights of the meeting took place on August 7, when we were set the task of flying as far as we could along a line to the south-east. We were told at briefing that if two pilots flew further than 200km (120 miles) the following day would be a rest day, and if two flew more than 300km (190 miles) the following two days would be rest days. At the time I was surprised, but in the event two of us exceeded the greater distance, and indeed it was the morning of the third day before we were ready to fly again, with over 750 miles added to the mileometer in the Vanguard that towed our trailer.

How to describe Italy through the eyes of a glider pilot? It is a country of valleys, some wide and some mere clefts, and tumbled hills and mountains. The wider valleys are more or less densely cultivated, some so densely that a landing is literally impossible. In the whole valley of the Arno from the coast to Florence, some 50 miles, and for a radius of 30 miles round Naples, although the ground is flat there is literally not one single open field in which one can land. But although elsewhere the fields look, from ground level, too small and overgrown with olives and vines and maize, from the air one can see a fair number of possible areas. On the lower hills and mountains there are frequently much larger fields, but heaven knows how one's trailer would reach the aircraft if one landed there. The high mountains to the east, rising up to 9,000ft in the Gran Sasso, are not of course landing country, but as long as one keeps sufficient altitude in hand to get away from them in case of need, they don't have to be.

The valleys are olive green and brown, the mountains dark green and brown and grey. The summer air is hazy with brown dust, the sky overhead a dusty blue. The ground is dry and hard, and a field which looks smooth and friendly from the air will, on contact with your skid, give your and your glider's frame a severe test. After each day's flying, the repair hangar would be full of the inverted fish-like hulls of gliders, holes being patched after minor landing mishaps. It is not a country for advanced aircraft of the "orchid" type, and I thanked heaven for the rugged Slingsby qualities of my Skylark.

The airfield of Santa Egidia is in the valley itself half way between the hill-top town of Perugia to the west and Assisi to the east, itself perched on a steep outlying spur of the 4,000ft Monte Subasio. Little could St Francis have dreamed that his monastery and the adjacent town would in the 20th century provide the ideal starting point for Icarus in real life; for, baking in the sun, Assisi produced a permanent thermal in which each morning we were launched by aero-tow. Each morning 30 beautiful man-made birds would circle and climb over Assisi, fly on to the vast slopes of Subasio, weave and rise above them, then set off on the flight of the day. But the saint's sympathy for flying things may have been called into play the first day, when two circling gliders overhead collided and plunged to destruction: for both pilots miraculously escaped by parachute, and the machines—the Spillo and a Kanguro—missed the town and littered themselves harmlessly amongst the trees on the mountainside beyond.

This gave us all, at briefing on the second day, a somewhat uneasy ten-little-nigger-boys feeling, but turned out to be the only serious accident of the meeting. There were one or two lucky escapes, notably when one pilot took off without connecting his elevator controls. This is the accident which neither man nor God can usually forgive, and is often fatal, but on this occasion God at least relented and the pilot—though not the unfortunate aircraft—escaped unscathed.

It would take too long to describe in detail each of the eight tasks we flew, for although each had its own interests and glories, they were basically in the same conditions. I won the first, a 100-mile out-and-return race to Rieti and back. On the second, a race across the mountains to the Adriatic coast, I lost myself in the high mountains and flew out east to safety but a low placing. This gave me a lot of leeway to make up, which I did laboriously but successfully, winning the fourth, fifth and seventh tasks, emerging at the top, and holding it easily on the last day. So I will confine myself to the longest task we were set, on August 7, to fly as far as possible along a line south-east amongst the mountains, from Assisi through Potenza to the southern coast beyond.

Over the Hills

The surface wind was light and north-westerly, the usual hot blue day. A surface temperature of nearly 80°F was needed to break down the inversion and give us lift to 4,000ft, and our ceiling would rise with the sun, eventually over the mountains reaching perhaps 10,000ft under and within the mountain cumulus.

It was useless to take off too early, so it was 1.15 before I was released over Assisi, to circle and climb with my friends and competitors over and above the slopes of Monte Subasio. At first, below the tree-line, we dodged into and out of the bays and crannies of the lower slopes, then we climbed to the grass-covered heights, Assisi became a cluster of white spots on its spur far below, then the mountain itself was overtopped and we set course east of south for the high mountains and our goal.

By now I had become accustomed to the look and layout of the country below, and had no hesitation on leaving the safe wide valley running south from Perugia to Spoleto on my right and setting course over the tumbled hills and valleys leading to the main high wall of the Appenines. The first 50 miles went by, a perpetual feast and wonder to the eyes, but without difficulty, for as the ground below rose, so did the height of the thermals, and high flat cumulus forming overhead made easy the location of the upcurrents beneath them. By 2.30 I was running down the wide central valley in the heart of the Appenines, from L'Aquila to Sulmona, on my left

Perugia, seen from over Santa Egidia Airfield. This photograph, and the one on the opposite page, was taken by Dr Brennig James, another competitor in the championships

ITALIAN ADVENTURE .. .

the giant wall of the Gran Sasso d'Italia, Monte Corvo, Corno, Paganica, 9,000 and 10,000ft giants, on my right, and almost as high, the chain including Monte d'Ocre and Monte Sirente. My own height was 10,000ft, plenty of lift, no worries in the world. As I flew south the valley wall of the Montagna del Masure on my left coalesced into the most gigantic soaring slope I have ever seen. From the valley the mountainside sprang up in a 45° slope for some 6,000ft, running on ahead of me for miles, and since this slope faced not only the wind but also the sun, I flew eagerly towards it, certain of finding miles of strong and friendly lift.

One of the rather surprising features of soaring on steep mountain slopes is that the upcurrent, though often strong, is only to be found very close indeed to the face of the mountain, so that until one gets used to it it is quite alarming to be flying along with one wing practically scraping a rock wall some thousands of feet high. But on this occasion I suffered one of the rudest shocks of my gliding career. Never have I been so certain of finding lift, and I had expected a climb of up to 1,000ft/min. Instead, as the trees and rocks ahead swung into close focus, the air beneath me seemed to open up, and I found myself plummeting down at the fantastic rate of 1,200ft/min. The mountains ahead and above seemed to leap up into the sky, the trees and cliff in front swept up like a rising theatre curtain, and I put the Skylark into a vertical bank, turned back to the valley, and rushed away from the invisible Niagara as fast as I could.

Cataract of Air

Clearly I had been caught out by the Adriatic sea-breeze, which must have been penetrating inland and cataracting over and down the mountain range into my valley. By the time I had escaped from its clutches, I was down to a mere 3,000ft over the valley north of Sulmona, with mountains ahead and right and left towering far above me. Unless I could find lift somehow, somewhere, I must land with only around 100 miles in the bag, which would almost certainly put me out of the running.

If the air was cataracting down the eastern valley walls, it was at least likely that the compensating upcurrents were to be found to the west, so I flew in that direction and soon found myself flying up a steep and narrowing side valley with a small stream running up it, round a right angle and the south up to the little Lago di Scano. I was down to 2,500ft, to the north was the 3,000ft Monte Prezza; the valley got narrower and I got lower; we came to the right angle bend, and I got a whiff of rising air. I circled tightly and looked back. If all went well I could just get back and out to the main valley. If I hung to my lift and it turned bad on me, it might be doubtful. A single-line railway had twisted up the little valley to just below, then it saw what it was facing, did a 180° turn, gave a gasp of horror at what it saw behind, turned a further 90° and dived straight into the mountainside, from which, as far as I could see, it never emerged. I wished I could follow suit. But slowly the tumbled air sorted itself out, slowly I climbed, and at last the air solidified into a coherent thermal. The valley below diminished, hope became certainty, and I was up and away again on my course, little daunted by the sight of another white sailplane, the Skylark of Brennig James, sailing overhead fast and free.

After this there were no more troubles for a long time, and as I flew on south-east past Campobasso the mountains became lower and less imperious. As the sun set, a strong sea breeze from the NNW came to help me on my way, but at the same time increasingly to cut down the thermals. At last, around 6 p.m. I was flying over a country of wide valleys and low hills with large stubble fields, and every now and then a grimmer higher ridge with the inevitable town perched on top of each. This was bound to lead to one final balancing decision, and in due course I got so low that it was just was or was not possible to surmount one final rough and unlandable ridge ahead, to reach the next wide valley beyond. On top was the town of Ariano. I took it on, and cleared its roofs with perhaps 200ft in hand. Ahead in the next valley lay my inevitable landing. I swept on down the slopes, over the valley, over a road, along the banks of a small river; a ploughed field offered a good landing place. I turned and approached it. Two feet above it I realized with horror that a ploughed field in Italy bore no relation to its featherbed counterpart in England, for this one was comprised of enormous chunks of earth, the size of paving-stones, baked as hard as rock. I prolonged my glide as well as I could to its far edge, but it got if anything worse, and we subsided onto it with a series of shattering jolts. I scrambled out and took a too-brief look at her (she seemed all right) and turned to meet the Italians pouring at me through the maize-field between me and the road.

Ten minutes later, and I was on the pillion of a small motor cycle buzzing along the straight road running for some miles parallel to the river, with fields of maize and roots and stubble on either side. A half mile or so down I had seen a farmhouse, and had assumed that there we would find a telephone, but we whizzed past this and went on and on. I tried to find out from my driver how far we were going, but could not understand his reply. It was half past six and suddenly I realized that it might well be dark before I could hope to get back to the Skylark—and, in the dark, could I find it? From the road, it was on the far side of a field of tall maize, and by day a glimpse could be caught of one wing-tip. But by night? However, there was nothing to be done, the telephone was the priority objective, so that Kitty and the trailer might find me before the night was out.

"After each day's flying, the repair hangar would be full of the fish-like hulls of gliders . . ."

After some six or seven miles our road joined another, turned left and crossed the river, and wound up to a large village called, I found, Grotta Minardo. In spite of urgent appeals, I was whizzed past the telephone exchange in the main street, and ushered into the presence of the chief of the carabinieri. After examining my papers, he put through a phone call, talked rapidly for a few minutes, and before I could stop him, hung up. I asked anxiously "Perugia?" and then was made to understand that this wasn't the form at all. The nearest village to my landing point was Castel Baronia, and it was the carabinieri in that area who must receive my report, sign my landing certificate, and presumably take me under their wing. It might take anything up to two hours to get through to Perugia, and before this I must be clocked in in the correct quarters. Nothing I could do prevented me being dumped once more on the pillion of my friend, and buzzed back to the road fork by the river bridge, where we sat, fuming, for half an hour. Then a jeep drew up with no fewer than five carabinieri on board. After more explanations, my papers were signed, the jeep disappeared down the road in the direction of the Skylark—I thought, incorrectly, to guard it until we turned up—and I was whizzed back to Grotta Minardo. In the office of the carabinieri there, and I found Biagi.

Biagi is a redoubtable French pilot, who was also flying in the Italian Championships. He is large and very dark and Southern, has a loud grating voice which is almost always in use, talks very

colloquial French, and is unexpectedly one of the kindest of men. Unlike me, he also speaks Italian, so his path had been much smoother than mine. Alas, he had just rung off after giving his position, a few miles short of mine, to Perugia. I must start all over again. He took me to the central exchange, and I put in my call. A query as to how long I might have to wait was answered with a shrug.

The telephone exchange at Grotta Minardo consists of a dark room which one enters from the street. On the left is a phone box. At the far end is a counter; behind the counter sits (or sat on this night) a very active, very cross, boy of apparently about 15 years, operating the actual phone board. He was—or looked—very cross because our half of the room seemed entirely full of Italians all talking at him or with each other at the tops of their voices. How through this uproar he could carry out his job was a mystery.

A few hard benches stood around, and I sat tiredly on one to wait. Soon I was surrounded by a ring of curious faces. "Inglesi?"—"Si." Thank heavens, this is a passport to friendliness in many countries. "Piloto aliante. Telephono Perugia fur mein"—dammit, I was breaking into German—"mia moglie con machina." Pretty well the end of my vocabulary. It was now dark, with the suddenness of those parts. Biagi had gone, he was fixing a bed for the night—did I want one too? Before I had contacted Perugia, I could not know, for I had no idea when the team would arrive to pick me up.

All the lights went out, except for the ghostly working of the green and red indicators on the switchboard. There was a moment's silence, then the scratch of a match, and the switchboard boy was unconcernedly lighting a candle and sticking it to his desk. The uproar broke out again, as loud and friendly as before. This, I thought, will be the moment when my call comes through, and I will be shut in a Stygian box unable even to read my map. But no, the lights went on again, and another hour passed by. I began to be glad we had been given two days for our return.

At last the boy looked up, pointed first at me and then at the phone box and said "Perugia." I dashed inside with my precious map, shut the door (the glass immediately becoming smudged outside with a dozen breaths) and picked up the receiver. A distant feminine voice said something incomprehensible (but which I took to mean "Are you there?" and I replied "Si") then "Wait" or words to that effect. I waited, for some 20 minutes, standing cramped and airless in my vertical coffin, with occasional words of hope and cheer from afar, "Pronto" or "Subito" or words to that effect. Then all the lights went out again.

Stand-by Lighting

Immediately my door was opened and half a dozen friendly hands came through, holding half a dozen lighted matches. As these burnt out, the smouldering ends were dropped, some on the floor and some on my feet, and others were lighted. In no time I was stamping around in my box like a performing bear, extinguishing incipient conflagrations and begging my helpers to desist until I had actually established communication, but it was a nervous while before my anguished message penetrated the language barrier. Suddenly the lights went on again, and ten minutes later—about nine o'clock—Perugia, a faint and far off Perugia, came through. They were as relieved to hear from me as I was from them. I tried to shout (a) the whereabouts of my glider, in a field near Castel Baronia and (b) my location in Grotta Minardo, and I understood in return that Kitty and the team were at the Alberge San Bartolomeo at Benevento, 20 miles away to the west. But I couldn't be quite sure that my message had got through, and asked one of my audience to take up the cudgels on my behalf. He took over the phone, shouted at it a lot, and then abruptly hung it up. All was well, he said; but somehow I doubted it. Anyway, the next thing was clearly to ring Benevento, and see if I could talk to Kitty.

This would have been a good plan, but alas the telephone book and finally the Benevento carabinieri both confirmed that that town boasted no Alberge San Bartolomeo, so once more I was suspended in uncertainty. Grotta Minardo exchange now showed signs of packing up for the night, so I was reduced to relying, as sometimes before—and never in vain—on Kitty's telepathic powers in finding me. But this was not the end of my problem, for on going out into the street I found the night was growing colder. I was wearing only a pair of shorts and an open-necked shirt, insufficient to keep me warm through a night in the open air waiting for an indefinite rescue.

The little town was bright and gay with cafés, and stalls selling slices of water-melon; a few neon lights overwhelmed the myriad stars and the pale new moon. In one of the cafés I found Biagi drinking a glass of beer, and talking volubly about his flight of the day. He had found an inn, would I come and eat with him and share his room? As I had eaten nothing except a few biscuits in the cockpit since breakfast, I gladly accepted the first offer, but was still undecided about the bed. Any moment the trailer might arrive, and no sailplane pilot likes to be found by his exhausted and hungry crew comfortably abed.

We were now in the southern part of Italy, where the "economic miracle" has not yet started to catch up. The inn was just a poor little house in a row of poor little houses, and we ate in a dark room on bare benches off a board table. But the kindliness and interest were there just the same. By midnight Biagi and I were drinking a last cup of coffee in the last café to stay open, then we repaired to a water-melon stall, which kept us going (and on my part shivering) till 1 a.m., watching every oncoming vehicle for the tell-tale yellow headlights of the Vanguard; but they did not arrive. At last, there was nothing for it, and I followed him back to the inn, up a dark narrow wooden stair into a tiny cell with two truckle beds. I took off my shoes and lay down and tried to doze.

Half an hour later there were steps on the stair, a knock on the door, and the landlord's son, half asleep, peered in and said "Camion—moglie." They had arrived. By one of her usual feats of second-sight, Kitty had found Grotta Minardo, wakened the carabinieri, and they had led her to my door. Outside I found the silver bulk of the trailer and the Vanguard with softly glowing yellow lights looming enormous between the sad stone houses under the stars. The first stage of the retrieve was over, pilot and team were reunited. We thanked the half-awake carabinieri and set off to find the third essential component, the Skylark.

* * *

We had not gone a hundred yards before we went over a minor bump in the road and the trailer behind emitted an agonising metallic screech. I uttered a yelp of horror, but the team (Kitty, Vanessa, Justin and an Italian young man, Italo Nannini) were unperturbed. "It started doing that miles back," said Kitty, "and we got out and greased everything we could think of, but it still does it. It doesn't seem to matter." We were all too tired to mind, so I decided to go on the remaining few miles to the glider and then have a good look. In another three miles I knew I had taken the wrong road. We pulled into a side lane and laboriously reversed. We drove back to Grotta Minardo and started again. This time the river bridge and fork duly turned up, but the screeches wore me down, and at length we put Justin in the trailer and drove on, so that he could locate them. He reported that they came from the starboard springs, so I got out and examined them. They seemed to be all right, but I put the grease-gun on them, and then, for luck, went round to the other side to do the same. Immediately the cause of the trouble was out: one of the shackles had come adrift and, with both shackle pins, was missing. The trailer was resting directly on the rear end of the spring. I looked at it; there was nothing to do. It had lasted for some miles, we must try and see if it would carry us for a few miles farther, to the glider, and then back to a village for repair. At ten miles an hour we squeaked despairingly on into the night.

The road went on straight and uniform, with maize and stubble on either side. At last I thought we must be near the machine, and we stopped. With our torches we scattered into the fields on our right and started searching. The hills bordering the valley to north and south loomed faintly in the starlight, and a few lights marked a small village here and there, but no Skylark was to be found. We went back to the car and drove on until some trees loomed up which, I felt sure, meant we had gone too far. We reversed again, and went back for another fruitless search. After this, we uncoupled the trailer, turned east again, and drove for miles, with me trying vainly to find some landmark. At last we had clearly gone too far, and again, despondently, we turned back. It looked as if we must simply stop and await the sunrise, now only an hour away, when in the glow of our headlight ahead we saw a small boy, trudging along

Looking north up the Tiber Valley from over Santa Egidia Airfield

ITALIAN ADVENTURE . . .

the road with a loaf of bread under his arm. We stopped, and Italo eagerly asked him if he knew where was the *aliante*. *Si, si*, he said, and we hauled him aboard. In a mile or so he stopped us, and dived into the fields on our left. We followed him; no glider. So again we spread around with our torches, and at last looming ahead I saw a group of trees bordering the river, which gave me a picture of my landing approach. Surely I had come in round them? I broke into a run and there, shining in the light of my torch, was the upflung wing of the Skylark. I shouted and waved. The pinpricks of torches centred on me, and soon the team were round her. We walked back to the road and, leaving one member marking the spot, drove back to the trailer, manhandled it round, hooked up, and ran back to the goal. Again we unhooked it, turned it round, jacked it up, and stumbled with our torches through the maize field to the Skylark. I shone my torch on her to start dismantling, and it lighted on a sinister crack in the underside of the fuselage. With a cry of horror I got down on my knees and played the beam along her keel. On either side the brick-hard ploughed earth had punched a number of remorseless little holes, and towards the stern was a large and ominous broken panel of ply. We were out of the race.

Or were we? We still had a day to get home and another for repair, if such was possible. The glider was damaged, the trailer was broken, and the car was giving signs of trouble. But we were at least all together again in one spot. The sky was lightening, dawn was on us, and with it our hearts rose, in spite of everything. My team was dauntless. I had first broken and then lost our aircraft, but their spirits were undimmed, and I certainly was not going to let the side down. We had won the day, as I had flown the farthest, and we would win the rest as well.

Getting the parts of the dismantled machine out of that field was a nightmare. In the half-light we stumbled and tripped our way with each succeeding component back to the road, desperately careful to damage her no more. But at last they were in, and we were ready to start back on the long road to Perugia. We crawled off, dropped our ten-year-old saviour, still clutching his loaf of bread, at a solitary farmhouse, and squeaked our way cautiously through Grotta Minardo, beginning to wake up, and on to the next village. Here, at seven o'clock in the morning, we found a small garage and with the extraordinary engineering facility of all Italians, the proprietor within the house rigged us up a new shackle within an hour.

The rest of the day was just an interminable battle against heat, dust, and the desire to sleep. We ran up Italy through Caserta, Capua, Cassino and round Rome, through names that echo in history both ancient and modern, but we were too tired to take much notice. At 7 p.m., just as the sun was setting, we were back at the home airfield. A night's sleep, a day with the cheerful and hard-working repair team, and on the morning of August 10 we were lined up for the next task, a 200km triangle race.

* * *

Memories? We brought back too many to record. One day we saw the beautiful frescoes of Giotto in the incredible Franciscan Monastery of Assisi, and the next I would be looking down at the white town ridge-backed on its mountain spur. There came an unforgettable moment when three Skylarks met and circled over the wonderful peak of Monte Cucco, two Englishmen and an Italian pirouetting together god-like over the beauty of the Appenines. At the end of our last task, I landed at the foot of a tiny village called Roca di Botti, perched on a mountainside overlooking a valley, closed to the east by the towering mountains: before landing I had flown up to the far end, but the dying evening lift would not give me enough height to overclimb them. Just before I turned back for my landing I flew over an outlying spur of steep and craggy rock, as hard and sharp and lifeless as a moonscape. On the very razor back of the spur, two thousand feet above the valley, I saw what looked like a tumbled ridge of immense teeth, like the armoured back of some vast prehistoric monster. As I whispered a hundred feet over them, I saw they were the incredibly remote remains of some long-forgotten mountain fortress or village, looking down on either side on nothing but boulders and rock and scree, no blade of vegetation, no water for miles. What sort of people could have possibly lived, two thousand years ago, in such a gaunt and unforgiving eyrie? Whoever they were, they could never have conceived that a man from a far northern country, then consisting of bog and swamp and inhabited by savages, would one day sweep silently over what remained of their roof-tops in a man-made bird, wondering about them and their harsh lives.

A little later, I stood and waited on the ledge on the mountainside which is the main street of Roca di Botti. Behind was a row of rough stone houses. In front, over a low balustrade, was the darkness of the valley, a few twinkling lights, the dark outlines of the mountains opposite and to my right. The warm night was full of the chirp of crickets; the villagers were strolling up and down their little street, untouched by the glories with which they lived. Overhead glittered the Milky Way and a million stars. The pale road corkscrewed down to the valley at my feet and then ran off to the left, where lay the world. Again I was waiting for the far gleam of yellow headlights. For the hundredth time I pitied the folk who cannot understand why we are fascinated by our sport. For all its discomforts, its stresses and occasional despairs, it leads us again and again to moments like these, when we get an unforeseen insight into the world which is going on, living its quiet and only slowly-changing life throughout the centuries, behind the cities and the H-bombs and the flickering glare of the television screen.

Roca di Botti and Rome, the Autostrade from Florence to Bologna and the surging skies of the Appenines, all are part of Italy and of the world we live in.

RESULTS OF ITALIAN CHAMPIONSHIPS, PERUGIA, AUGUST 1-13, 1961

	Pilot	Aircraft	Marks
1.	Wills (Br)	Skylark 3F	7,429
2.	Pronzati	Mucha Standart	6,683
3.	Vitelli	M 100 S	6,680
4.	Biagi (France)	Breguet 901	6,583
5.	Hachler (Switz)	Ka 6	6,553
6.	Ferrari	Skylark 3B	6,267
7.	James (Br)	Skylark 3F	5,454

LEASE FOR LASHAM

NEWS OF THE SIGNING of a lease guaranteeing the future security of Lasham Gliding Centre is contained in the October issue of the British Gliding Association's magazine *Sailplane and Gliding*, where the details are described by Mr Walter Kahn as follows:—

"On September 1, 1961, a lease was granted to the Lasham Gliding Society Ltd. After 11 very long years, we are at last firmly entrenched. We have been granted a 21-year lease with an option to renew for a further period of 21 years.

"The building programme which we have planned in great detail will now be started, and in fact the cleaning down and recladding of our hangar at a cost of nearly £7,000 was started on September 4. The new clubhouse, which incorporates bedrooms, offices, lecture rooms, bar and catering facilities will, we hope, be started early next year.

"It is our intention to provide first-class flying and social facilities not only for our own 900 members, but also for our many visitors and friends from both home and abroad who visit Lasham from time to time. Apart from events such as the national championships, we hope to run many more instructors' and other specialized courses so that we may truly be described as 'The Lasham Gliding Centre.'

"Our rebuilding scheme will cost a great deal of money. Our members have already given over £10,000 and we hope to collect a great deal more. A national appeal has been launched and naturally we hope that this will produce a fairly large sum. If any of our friends would like to send a donation, any sum, however small, will be very much appreciated . . ."

FIRST TIME HERE

"Ballerina," one of the four Cosmic Wind racers designed and built by Tony Le Vier & Associates, was recently shipped from the USA and reassembled by the Hampshire Aeroplane Club at Eastleigh. Powered by an 85 h.p. Continental, the little aircraft has an empty weight of 540lb, a 19ft 6in span and 16ft length and is capable of about 190 m.p.h.

"Ballerina" was second in the 1950 Continental Motors Race

SPORT AND BUSINESS

Private View

BY P.P.O.

". . . the type of aerobatic display which draws the crowds is quite different from the display which will get marks from expert judges"

NOW that the market for light aeroplanes in this country has begun to revive a little, the pattern it is likely to take has been exercising quite a number of people's minds. What type of aeroplane is likely to be the most popular? When is the best time of the year to buy or sell an aeroplane? How long are we wise to hold on to what we have bought, and what will be the second-hand value of our machine when we come to sell it?

None of these questions can be answered clearly and definitely yet. As the years go by the answers will emerge. But most of us have plenty of ideas, some coloured by self-interest and some based on prejudice, or just what we are used to. It is always fun to discuss the shape of things to come, and best fun of all if, by some fluke, our prognostications come true. Like the racing tipster's, the art of the thing is to have one of those well-ordered memories that only recalls the successes, and lets the failures disappear into the limbo with no delay at all!

Now, the type of aeroplane—high wing or low wing, nosewheel or tailwheel, metal or wood construction, one, two, three, four or more seats, one engine or two? The answers here would require an essay in themselves, which, in any case, might well be wrong. But in finding the answers I suggest we should look to the future rather than to the past. Are airfield circuits likely to become more or less crowded? Will pilots prefer grass or tarmac runways? How important are looks and cost? How easy may it be to get repairs done in out-of-the-way places? Will engines become more or less reliable? And what is really the determining factor in deciding anyone to make a journey by light aeroplane? Is it comfort, speed, or cost?

Just now everybody, even in America and France, is still feeling the way. Different terrains and conditions will produce different answers, but in time the general configurations of design will solidify and it will be the truly lucky manufacturer who has been working on and developing the popular type who will benefit.

The single-owner life of an aeroplane will depend on how well it is maintained, its use, and how quickly greatly improved models will make it obsolete. With this must surely be closely linked second-hand values. It seems certain that in these respects the aeroplane will be a much slower liver than a car. The modern tendency for roomier cabins, as exemplified by the new Beagle 206 and the French Mousquetaire, has surely come to stay. Statisticians tell us that people are getting bigger. To provide more headroom and wider seats costs little, and can even lead to better aerodynamics. Air weighs nothing, so why not have plenty of it? The danger of too many seats or too much baggage space is obvious. People vary in weight in the ratio of at least 1 to 3, and private pilots and passengers cannot be expected to carry weighing machines with them, and they seldom read notices. The honest manufacturer will not provide more luggage space or seats than his aircraft can carry very easily, and will leave good margin for the careless and the casual.

★ ★ ★

Farnborough has come and gone, and still seems to exercise its magnetic attraction for everyone interested in the air, and many who are not and just want a day out. I am told that the week in September which is always chosen has been proved to average the best weather of the year. That is why the Popular Flying Association also chose Farnborough Saturday for their Annual International Rally this year at Swansea. They were both right. Saturday was a glorious day, although it was a little hard on those members of the Tiger Club who wanted to be in both places at once.

But my! What a contrast! It would be ill-mannered indeed to criticize the good natured, tolerant and generous way with which the SBAC and the aircraft trade treated the amiable efforts of the Tiger Club to be amusing during the lunch time, and their hospitality afterwards. But one couldn't help reflecting that if only the tiniest fraction of what was being spent at Farnborough on entertaining alone could be devoted to helping the spirit which the PFA is trying to foster, the British aircraft industry of the future would be on far firmer conditions. It is a jolly good thing to manure your field with large dollops of expensive fertilizer—animal, vegetable, or mineral—but not much use if you have no good seed sown for the future.

★ ★ ★

I have just picked up a useful little gadget from America (and in which I have no commercial interest) that every private pilot ought to have. It is a blind-flying shield and is simply an affair of dark plastic which you put over your head, rather like horses' blinkers. This prevents you from looking out sideways. At the time of writing I have not yet tried it out, but it seems to be just what we have been looking for—an opportunity to try out our instrument flying technique without going into cloud, and while keeping a good look out for other air users. Method—when flying with a passenger to act as look-out, fit the thing on and see how long you can maintain straight and level flight by looking only at your instruments. Then, after a good look round the sky, get your passenger to kick the rudder and pull the stick and see how quickly you can regain your equilibrium. Most of us have tried to do this without the hood, but it is impossible not to take a sly glance through the windscreen, and even the normal daylight gives you an angle which you would not get if you were really in trouble in fog over the sea. The experts who fly on instruments in the big aircraft for hours on end will laugh a little, but I can assure them that the private pilot who has always flown by the horizon and a sight of the ground can get very troubled indeed if he is only even momentarily lost in a cloud or fog, and it is the panic which may ensue that causes accidents. This little tool looks as though it could be very helpful.

★ ★ ★

Word comes today from our old friend, Frank Price, of Texas. It seems that at long last they are going to run national aerobatic competitions in America. This is good news, as the gentle art of aerobatics seemed in danger of dying out in that country. But it underlines the difficulty which has already cropped up in aerobatic competitions both here, and in Czechoslovakia. Are the judges going to judge the man or the machine? Obviously, if you are looking for a world or a national aerobatic champion, you must judge the pilot. If you are going to do this, ideally all pilots must fly the same type of machine, and it mustn't be too easy to get results from it.

Basically, the problem is linked up with the fact that the type of aerobatic display which draws the crowds is quite different from the display which will get marks from expert judges. Aerobatic pilots, having to eat, like all of us, often (especially in France) give performances for a fee at air displays. One of the best displays I have seen this year was put up at Bristol by the local instructor, and he used a standard Tiger Moth. His show could not have ranked at all in the Lockheed, but for sheer interest and excitement without undue danger, it was first class. To have been able to print in the programme that he was placed in the Lockheed or a world championship would have helped, but you could never get a lot of people to watch Lockheed elimination contests. So why, therefore, do you need to have an aircraft which will do too many hair-raising feats for competition purposes, when Tigers, suitably fitted out, can give private pilots a test of skill which will give judges ample scope for producing a fair and thoughtful list of prizewinners?

Straight and Level

● *"This is not to say that there should be no regulating body for hovercraft services . . ."*

I quote from that esteemed journal *Flight*, for which I placed a regular order with my newsagent some time ago. I disagree with that suggestion so strongly that, enjoying good arguments as I do, I have now doubled my order.

Why *should* hovercraft services be licensed? We are so preoccupied with rules and regulations that we have got into the habit of making and applying them just for their own sake. It would be a calamity for the hovercraft if it were to be confined by the rules and regulations that are applied to aircraft. (I'm talking about commercial, not technical, rules and regulations.)

For goodness' sake let's leave the hovercraft alone. Let it ply for trade when and where it will, bound only by the rules of safety and navigation. One day, perhaps, it will be operating on a scale that calls for the licensing of its services; then, maybe, some regulations will be necessary. But until then, hands off the hovercraft.

● Warranted extract from recent letter to *Flight*:—

"I am at present preparing a lecture on the ——, to be presented before the Royal Aeronautical Society. I would be grateful if you could supply me with any photographs and information on this aircraft . . ."

● Despite the "Shock for British Air Chiefs" treatment that it got in some newspapers, I wasn't all that cast down by TWA's order for Caravelles. After all, there is no other aeroplane quite like it. But what depressed me a little were the orders placed by East African Airways and Nigeria Airways for Fokker Friendships.

Without any doubt whatsoever, the Friendship is a fine —and proven—airliner. And Nigeria Airways is the national airline of an independent country, even though it is a Commonwealth country. But I am sorry that EAA couldn't, wouldn't, or at any rate didn't, buy British. That they did not do so makes me wonder whether there are still any wishful-thinkers left who believe that Britain's aircraft industry enjoys some kind of magic preferences and privileges in Commonwealth markets.

Of course, Aerolineas Argentinas could have bought Friendships instead of 748s. And Itavia of Italy could have bought Friendships instead of Heralds. That makes me feel a bit better.

"Six hundred and ninety-seven. Six hundred and ninety-eight. DAMN. One. Two. Three..." (The picture-agency caption tells me that this gentleman is checking Conway blades in a Canadian Pacific DC-8)

Undismayed by Brig-Gen Flickinger's pronouncement ("Flight" last week) that the USA is a generation behind the USSR in science and technology, Chicago is sounding forth a challenge of her own. Billed as the world's first female astronaut, Miss Patricia O'Brien is soaring through the skies for more than a month in this spaceship, to publicize a new suburban housing scheme. "She entered the 32ft-long craft," the picture-agency caption informs me, on September 24, and is seen "as she takes on provisions supplied by milkman Steve Saranowski." In Britain, Steve, our space-age chicks all drinka pinta milky way

● The other day the telephone rang in our photographic library. "Hello," said a voice. "Have you got a picture of a Hereford?"

"Yes, certainly," replied our photographic librarian. "Any particular view?"

"I'd like a three-quarter front showing the horns and curly hair."

It seems there were some crossed wires as well as curly hair. The caller wanted *Farmer and Stockbreeder*, one of our associated journals.

● In a letter to *The Guardian*, the Professor of Therapeutics and Pharmacology at Queen's University, Belfast, says:

"I should like a clear and unequivocal answer to two questions:

"(1) If all seats in airliners faced backwards would more lives be saved in air crashes?

"(2) If the answer to the first question is 'Yes,' even though the saving of life is small, why are backward-facing seats not fitted?

"I believe many air passengers would like a clear answer to these questions."

They'll never get the answers from the airlines or from the Government, but here they are:

(1) The medical evidence is now such that the answer, beyond all reasonable doubt, is "Yes"; (2) Because it might cost money.

● The following has come my way, and I hasten to share my good fortune:—

The Boeings We Ordered in '61

(With apologies to the late W. S. Gilbert.)

("The Boeings we ordered in '61 have nothing to do with the case"—Counsel for BOAC at the hearing of the appeal against the grant of a licence for a transatlantic scheduled service to Cunard Eagle Airways.)

The Boeings we ordered in '61 have nothing
to do with the case.
It was one of those things that are freely done,
With a gay irresponsible sense of fun
And a wholly inscrutable face.
But we claim, as a ground of this plaintive
appeal,
That diversion of traffic will surely be real,
And you shoudn't allow Cunard Eagle to steal
The passengers we, with sincerity, feel
Should be carried by us in our national fleet
Of VC10s, Boeings and Brits (obsolete)
But not, most assuredly NOT, we repeat,
The Boeings of '61.

● *"Before the war he [Mr Julian Amery] flew Avro Tudors, with a maximum speed of 150 miles an hour."*

News-agency report of the Air Minister's recent supersonic flight in a Lightning.

ROGER BACON

AIR COMMERCE

TRAFFIC INCREASES AT UK AIRPORTS

THE number of transport aircraft movements and passengers handled at the major UK airports continues to rise. In June 1961 the number of passengers totalled 1,462,899, an increase of 24 per cent over the same month last year, while movements increased by 15 per cent to 51,585.

During the first six months of this year air transport movements totalled 190,664, a 10 per cent increase over the same period last year, with the passenger total up by 24 per cent to nearly 5,250,000. The larger increase in passengers handled reflects the greater capacity available and the increased use of big jet aircraft.

Taking airports in the London area as a whole, air transport movements increased by 12 per cent and passengers by 21 per cent. At Heathrow there were 67,968 transport movements and 2,684,969 passengers, increases of 11 per cent and 18 per cent respectively. Shown in the table below are typical increases.

Airport	Passengers	Percentage increase	Airport	Passengers	Percentage increase
Heathrow	2,684,969	18	Stansted	44,960	171
Ringway	388,155	31	Blackpool	44,547	59
Gatwick	254,775	65	Yeadon	38,407	67
Hurn	77,516	149	Bristol	26,699	55
Newcastle	52,974	60	Portsmouth	9,905	411

TRINIDAD TO ACQUIRE BWIA

AS forecast in last week's issue, the Trinidad Government is to acquire the majority shareholding in BWIA, and agreement was reached with BOAC on October 7 at Port of Spain. The transfer will take place on November 1, and the Corporation will retain a 10 per cent holding as well as a seat on the board. Sir Matthew Slattery, chairman of BOAC, said "I am delighted at the outcome of these negotiations and particularly that BOAC is to remain associated with the West Indian airline."

SUPERSONICS AND POOLING

SOME interesting (although not entirely unexpected) opinions on the necessity for pooling in supersonic operations are revealed in the *Report of the Discussions*—only now available—at the IATA supersonic symposium in Montreal in April; this event, which embraced many aspects of supersonic operation, was the subject of an article in *Flight* for May 25. Pooling is thought to be an essential factor in enabling the smaller and medium-sized airline to enter supersonic operations, as it would be the only means for smaller airlines with limited route-networks to obtain adequate utilization. Pooling arrangements, says the report, "had increased considerably with the introduction of subsonic jet aircraft"—a reminder of what some may feel to be the great paradox of modern air transport: that, the more competitive airliners get, the less competitive they become.

To make possible such an increase in pooling of aircraft and associated equipment, airlines would have to agree in the preliminary design stages of the supersonic airliner on certain basic design-parameters, systems and design features. Many of the current differences in individual airline requirements affecting such things as airborne equipment and cockpit layout would probably have to be eliminated. Pooling may have to be extended far beyond the fields of revenue and costs into many other spheres such as purchase price (capital investment), insurance, training facilities, ground handling equipment and maintenance.

There is already a certain amount of pooling in some of these spheres, as instanced by the agreements between SAS and Swissair, but some manufacturers feel it very important for airlines to determine at an early stage the type of pooling arrangements they would be prepared to employ with supersonic airliners, since the degree of pooling will effect the number of aircraft ordered. If more extensive pooling was envisaged, much better co-ordination would have to be established with manufacturers early in the design stage.

OVERSEAS SUBSIDIARY TO BE WOUND UP

AN approximate statement of the affairs of Overseas Aviation Engineering (GB) Ltd presented at a meeting on October 4 showed unsecured liabilities of £147,211 due to 385 creditors for amounts ranging from 1s to £31,200. The meeting was called to consider the voluntary winding up of the company, and Mr Ronald Myhill, a director, presided. According to the *Financial Times* the company's assets were estimated to realize £48,630, less £42,695 for preferential claims, leaving net assets of £5,935, or a deficiency as regards unsecured creditors of £141,276.

Mr Myhill, reading from a prepared report, stated that the company, formed in 1959, had an issued capital of £100. Its main function was to repair and service the aircraft of the "operating company" Overseas Aviation (CI) Ltd. Difficulties were experienced when the company moved to Gatwick and expenses were incurred during the building of a hangar. The company's only source of income was the operating company, and when that concern collapsed further trading became impossible. Creditors confirmed the voluntary liquidation of the company.

Capt John Woodman, BOAC's chief pilot, will fly the Queen and the Duke of Edinburgh to Ghana on November 9 in a Boeing 707. Capt Woodman began flying in 1934 and joined Imperial Airways in 1936, becoming a captain two years later

GUEST TO SUSPEND ATLANTIC SERVICES?

THE recent reorganization of Guest Aerovias Mexico SA's finances whereby a group of Mexican financiers bought the shareholdings of SAS and Winston Guest (the airline's founder and president) does not appear to have solved all the company's problems. According to *Aviation Daily*, the airline, with losses of $7.6m for the past three years, has applied to the Mexican Government for permission to suspend its thrice-weekly mid-Atlantic service from Mexico City to Lisbon, Madrid and Paris. As reported in *Flight* for September 14, considerable training and development costs associated with the introduction of new equipment, and a pilots' dispute, have contributed to a worsening financial position.

The other major Mexican carriers, Aeronaves de Mexico and Compañia Mexicana de Aviacion, are also reported to be in financial difficulties. This latest move by Guest may help to confirm recent speculations that all three airlines may unite to form one Mexican flag carrier for international operations at least, following a pattern already established by Venezuela and Brazil. Guest plan to continue their regional services to Miami, Guatemala City, San Jose, Curacao and Caracas. Their present fleet includes three DC-6s and three L.10496s, as well as a Comet 4C, leased from CMA.

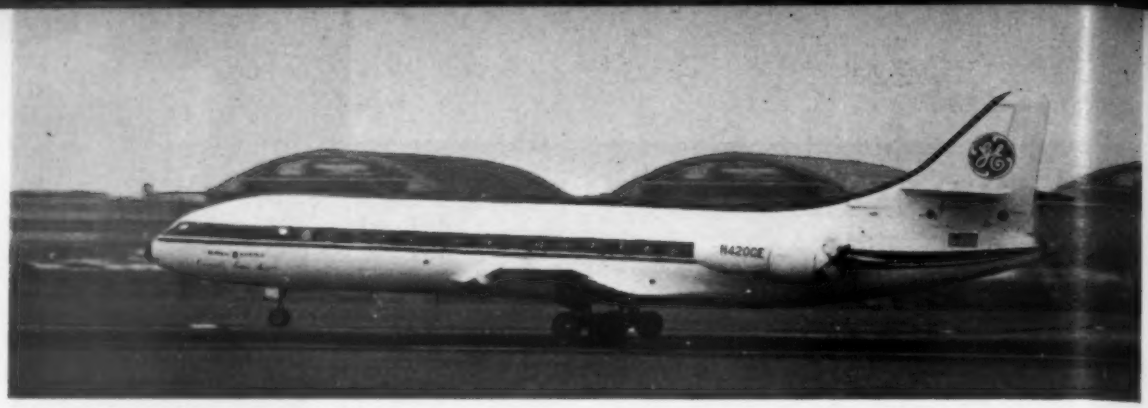
Footnote: As this issue goes to press it is learned that the Mexican Government has offered approximately $127m to Guest, Aeronaves and CMA, representing 50 per cent of the funds required to form a consortium to purchase US-manufactured jet equipment.

DERBY AVIATION DC-3 ACCIDENT

THIRTY-ONE passengers and the crew of three lost their lives when a DC-3 of Derby Aviation *en route* from Gatwick to Perpignan flew into the 9,137ft peak of Canigou in the Pyrénées, a little over 30 miles from Perpignan. There were no survivors. The DC-3, which had been due to arrive at 0100hr local time on October 7, was carrying a party of local-government officials, Civil Servants and their families and had been chartered by Whitehall Travel Ltd, who arrange inclusive tours for Civil Servants.

There were fierce storms over southern France and winds of up to 120 m.p.h. were recorded along the Mediterranean coast. The DC-3 is believed to have been caught in one of these storms and changed course; Maurice Bellonte, French Inspector-General of Civil Aviation, is quoted as saying that he thought it possible for one of the "atmospheric percussions" for which the area is noted to have driven the DC-3 into the mountain. These disturbances, which are naturally more severe in stormy weather, are up-currents of some 70 to 80 m.p.h. in strength. According to Capt Bornand, leader of the mountain rescue team, if the DC-3 had flown 500yd more to the left, it would have passed safely through a gap.

A Lloyd International Airways DC-4 was burnt out at Malaga on October 8 after a petrol tanker exploded during refuelling. The 34 passengers, who were being flown from Tangier to Manchester, were in the airport building at the time, but they lost their luggage. Another 32 passengers were to have been picked up at Malaga.



The General Electric Caravelle "Santa Maria," seen here at Le Bourget, is powered by CJ-805-23C aft-fan turbojets of the type that will power the Caravelle 10As of TWA (see news-item on this page)

AIR COMMERCE...

DC-8 HYDRAULIC-SYSTEM CHANGES

FOLLOWING several incidents in which DC-8s suffering loss of hydraulic brake fluid have swerved off the runway when pilots have attempted to stop them by using reverse thrust, the FAA has ordered all American operators of these aircraft to use new procedures for emergency runway braking in the event of hydraulic failure. A warning is given not to go into reverse thrust until all wheels are firmly on the ground, and not to apply reverse thrust on the outboard engines until it is certain that the inboard engine braking thrust is taking hold smoothly. Pilots are cautioned to check certain warning indicators before applying reverse thrust.

Asymetric reverse thrust is believed to have been responsible for several DC-8s swerving off the runway, and following receipt of an FAA questionnaire posing ten questions of the "true or false" type about the hydraulic system, over 600 pilots of Eastern Air Lines have threatened to stop flying DC-8s on the grounds that it is the FAA's responsibility, not theirs, to ensure the safety of the hydraulics, and that if the pilots answered the questionnaire without argument they might be blamed unjustifiably for subsequent incidents.

Mr Najeeb Halaby, administrator of the FAA, has since announced in Los Angeles that five important changes are to be made in the DC-8's hydraulic system following "a series of serious malfunctions." Douglas are to make all the recommended changes themselves, and aircraft will not be grounded unless something unexpected happens.

The five changes to the system and procedures are (1) an increase in hydraulic reserve capacity available for key system operation, particularly in emergency conditions (increased braking capacity, nosewheel steering, rudder power and additional wing spoiler actuation during ground roll); (2) provision of elements to reduce fluctuating pressures sometimes encountered that lead to leaks and loss of fluid; (3) installation of mechanical devices to prevent accidental application of engine thrust reversal during landing; (4) examination of flight crews on emergency procedures in the event of hydraulic failure; (5) intensified FAA supervision of airline maintenance practices.

CARAVELLE 10A DETAILS

NEW details are available of the Mk 10A version of the Caravelle, of which TWA has ordered 20, with an option on 15 more. Powered by two 16,100lb s.t. General Electric CJ-805-23C aft-fan turbojets, the Caravelle 10A can be regarded as the production version of the Mk 7, and will probably supersede it. Like the Mk 7, it has a 3ft 4in longer fuselage and a take-off weight increased to 114,640lb. Up to 68 first-class or 89 tourist passengers can be accommodated. The cabin windows have been placed higher, and the forward-cabin door has airstairs. Freight space under the floor has been increased from 282.5 cu ft to 353.2 cu ft and flight-deck visibility has been improved. There are now single-point refuelling facilities. Wing dimensions are unchanged, but low-speed performance has been improved. Maximum-cruise thrust of the CJ-805-23C has recently been increased by 7 per cent, with an attendant s.f.c. increase of 13 per cent. The prototype Caravelle 10A is now being assembled at Toulouse.

Weights: Max take-off, 114,640lb; max landing, 109,130lb; max zero fuel, 85,980lb; max payload, 19,840lb.
Performance: Max cruising speed, 524 m.p.h. at 22,640ft; normal cruising speed, 491 m.p.h. at 32,810ft and 99,210lb; range with max payload, about 1,680 miles; max range, about 2,140 miles with 14,990lb payload and 7,520lb fuel reserves; take-off distance, 6,398ft; landing distance, 5,643ft.

BOOK NOW—SCHEDULE LATER

AN unusual new approach to airline reservations has been adopted by BKS, who have experienced some difficulty in meeting demand on the Leeds/Bradford - Channel Islands route with adequate schedules. For the past seven years, demand on this route has exceeded supply, in spite of increased schedules; this year over 40 flights per week offering over 1,500 seats were operated; and even in September, when traffic normally tails off, 20 extra flights were introduced to meet the demand.

To solve this problem of scheduling over a highly seasonal route, BKS has evolved what it calls the "Book Now—Schedule Later" scheme, the essence of which is that the number of flights to be scheduled each day will be related to reservations received; there will be daily flights from Leeds/Bradford to Jersey and Guernsey from April 1 to October 31. All BKS-appointed travel agents (of which there are over 900 in Britain alone) will have open-sale facilities up to one month before departure date, allowing an agent to confirm any reservation without prior reference to a BKS office; telephone calls will be unnecessary for advance bookings.

Agents will have the choice of specifying morning or afternoon flights in each direction within certain departure-time limits, i.e., morning departures southbound between 0830hr and 1030hr, or afternoon departures northbound between 1645hr and 1845hr. Written confirmation on pre-printed forms showing times and date of travel are prepared by the agent and forwarded to the BKS

Complementing the engineering mock-up at Hurn is this completely furnished customer mock-up of the BAC One-Eleven at Weybridge. The cabin is 124in wide and the 49 passenger windows maintain the Viscount's characteristic elliptical shape, but are smaller. An initial batch of twenty One-Elevens is being laid down

Leeds/Bradford office, and one month before flight departure BKS will issue a confirmation card giving precise departure times and flight numbers. The scheme is not, perhaps, so flexible as the "walk-on" or shuttle type of service, since reservations within one month of departure have to be requested in the usual manner, but the Book Now—Schedule Later concept may be regarded as an intermediate step between conventional and walk-on services. With this new system, BKS hopes to carry over 50,000 passengers between Leeds/Bradford and the Channel Islands next year.

CANNON STREET HELIPORT OPPOSED

FOLLOWING Lambeth Council's protest to the Minister of Aviation against the proposed Nine Elms heliport, the Court of Common Council of the City of London have been recommended to oppose the Ministry's plan to use the new roof of Cannon Street Station as a heliport. The recommendation has been made by a special committee which has been considering the question, and if the Court of Common Council accepts it then two of the three heliport sites recommended by the Committee on the Planning of Helicopter Stations in the London Area (see page 168, *Flight*, August 3) will, unless there is a change of heart, have been wholly or partly ruled out because of noise objections. The special committee which reported to the Court of Common Council regards the Cannon Street site as "unsuitable," and feels that the Nine Elms and St Katharine Docks sites are preferable, although such a heliport should really be sited on the perimeter of the central area.

The committee's objections are not entirely centred on the noise aspect. A multi-storey car park now under construction would have to be modified to allow incorporation with a heliport and, in contrast to the other two sites, which are in public ownership, the Cannon Street site is complicated by several ownerships and by the urgency of redevelopment proposals now in hand or demanding early attention. Establishment of the heliport is also opposed on noise grounds; within a quarter of a mile there are 45,000 office workers, 330 residents, the Mansion House, some City churches and Southwark Cathedral. If the third site, St Katharine Docks, is also vetoed (and the Port of London Authority regards its development as incompatible with others there) then where do we go from here? Will there be another Committee on the Planning of Helicopter Stations in the London Area? Another report taking two years to prepare and costing over £900? And further vetoes by the localities where heliports are suggested?

AIR CEYLON LINKS UP WITH BOAC

AS BOAC will be the only foreign carrier serving Ceylon, it is not altogether surprising news that Air Ceylon is to operate international services in conjunction with BOAC. As reported in *Flight* for September 14 and 28, KLM have terminated their agreement with Air Ceylon whereby the latter operated a KLM Electra on the London - Colombo - Singapore service.

Announcing the new agreement in the House of Representatives, Mr Kalugalla, Ceylon's Minister of Transport, said that the link-up would ensure the continuance of Air Ceylon's international services. He also stated that Air Ceylon would charter a Comet 4 which would "very soon" carry Ceylon's flag and insignia on international routes; BOAC officials in London had assured him of a reasonable profit on this operation. He added that BOAC had agreed to bear any losses incurred during the first year of operation. (It is apparent that the prospect of Air Ceylon becoming a consistently loss-making BOAC Associated Company is one that will have to be closely guarded against.)

Mr Kalugalla's last announcement is particularly significant, because a contributary factor to Air Ceylon's demise has been finance. In announcing that the original agreement with KLM had been terminated, the Government said that an agreement would be concluded with another carrier provided there were reasonable prospects of a profit.

The Ceylon Government is considering certain proposals to form a pool with Indian Airlines Corporation for regional air services. A further statement on this is expected in the near future.

HURRICANE RELIEF BY ARGOSY

A RIDDLE AIRLINES Argosy, guided around the worst areas by military ground radar, flew recently through the aftermath of hurricane Carla to deliver five urgently needed generators to Bergstrom Air Force Base, near Austin, Texas, from Oklahoma City. This was the Argosy's first commercial flight in the USA; Riddle's Argosies are busily engaged on Logair contract work, and the aircraft that flew the generators to Texas was chartered by the South Western Bell Telephone Co. The generators weighed 4,000lb each, and were delivered to Bergstrom AFB because this was the nearest airport to the storm-damaged area open to commercial traffic.

Seen against the tail of a BOAC Boeing 707 is a new electrically controlled multi-level maintenance platform designed by Mercury Airfield Equipment Ltd of Gloucester. Controlled by a 24v push-button unit built into the working platform, it can be raised to a height of 40ft

ANGLO-FRENCH SUPERSONIC CO-OPERATION

THE French Transport Minister, M Robert Buron, had informal discussions on October 2 with Mr Ernest Marples, Minister of Transport, and Mr Peter Thorneycroft, Minister of Aviation, on "a number of topics of common concern." Said a Ministry of Aviation spokesman: "These talks dealt with technical studies and the possibility of collaboration in a number of fields will now be pursued."

Supersonic airliner collaboration was almost certainly among the topics discussed; and, according to *Interavia*, both Sud-Aviation and Marcel Dassault are working on aircraft of this type. The two companies are consulting, but each has a separate study for an 80-90-passenger M2.2 airliner powered by four relatively low-compression-ratio Rolls-Royce turbojets. Sud-Aviation's concept was shown in model form at the Paris Salon; Dassault is said to be studying a canard delta with outer wings folding downwards for cruising flight, and powered by four engines mounted in the rear of the fuselage. Its range would be some 2,300 miles and a prototype could be flying by 1966; Sud-Aviation's project would probably have a rather shorter range, of the order of 1,500-1,800 miles. Tests would be carried out by a Mirage IV to investigate sonic boom effects.

Both projects are under the supervision of the French Air Ministry's Direction Technique et Industrielle de l'Aeronautique (DTI). It is by no means certain that France will go ahead with a purely national supersonic airliner, especially since Air France is reported to have indicated already that it would have no interest in a medium-range SST. Sud-Aviation would be the prime contractor, whether the Sud or Dassault design was chosen. If the latter, Dassault would have major technical responsibility based on Mirage experience; if the former, Dassault would probably participate in development work and certainly in production of any Sud design.

CHA'S TWELFTH ANNIVERSARY

TWELVE years ago, on August 20, 1949, Chicago Helicopter Airways inaugurated operations as Helicopter Air Services Inc with mail services to 54 Chicago suburban post offices. Under its new title the company began scheduled passenger services on November 12, 1956, between the Chicago airports O'Hare and Midway. Since that time CHA has flown more than 6,272,000 scheduled miles and carried over 824,000 passengers and 27.3m lb of air mail. CHA was certified by the CAB to transport passengers, property and mail within a 60-mile radius of O'Hare International airport for a seven-year period from June 8, 1956.

The acceptance of the helicopter service by the citizens of Chicago and visiting airline passengers was evident from the fact that within 19 months of starting operations, CHA carried its 100,000th passenger. The main advantage is, of course, time. To quote an example, the journey between the two airports by taxi takes approximately 1hr 10min, whilst the helicopter takes 11min.

By July 1961 the company's fleet of helicopters had amassed a total of 100,138hr since the service started. CHA at present schedules 165 daily flights on its 42-mile triangle serving Midway, O'Hare and Meigs Field. Nine flights operate to Winnetka, Illinois, and eight to Gary, Indiana, daily except Saturdays and Sundays. The airline operates a fleet of seven Sikorsky S-58 12-passenger helicopters on passenger services, and four Bell 47Gs on suburban mail services. On order are three Sikorsky S-61L turbine helicopters.

One of Swissair's Convair 880 Model 22Ms, HB-ICM, at Zürich on arrival from Tokyo. Shown here are the company's new covered passenger steps which are in use at Zürich and Geneva and which will be introduced at other airports. An account of a flight to Bangkok on these aircraft, by John Stroud, appears on pages 578-579

AIR COMMERCE...

THE BIG APPEAL (Continued)

CONTINUED here in condensed form is the hearing before Sir Fred Pritchard of BOAC's appeal against the award of Cunard Eagle's North Atlantic licence. The first two days of the hearing were covered in last week's issue; the proceedings of September 28 and part of September 29 are summarized below.

CONTINUING his evidence for BOAC, Sir Basil Smallpeice stated that the failure of traffic on the North Atlantic services to come up to expectations had resulted in a loss of £650,000 in the first 16 weeks of 1961-62 compared with a profit of £350,000 in the corresponding period in 1960-61; this was apart from the effects of the strikes in June and July. Sir Basil ascribed this disappointment to a reduction in travel to Europe by US citizens, with an increasing tendency for those who did fly the Atlantic to use American carriers (by direction if they were travelling at Government expense); to the effect of the 17-day excursion fare, available only up to March 31, which had resulted in many people travelling earlier than they would otherwise have done; to a reduction in the number of passengers to or from European centres travelling by BOAC between America and London because more European cities were now served by direct jet flights; and to the discouraging effect on tourism of political unrest in France and the mounting tension over Berlin.

All these factors made it necessary to revise forward traffic estimates. Some people felt that North Atlantic air travel had reached saturation point: BOAC took the less pessimistic view that, with favourable conditions, a reduced rate of growth might be resumed next year, but from a smaller figure than had been expected. Whatever view was taken it was certain that there was now less justification than in May for Cunard Eagle's "facile assumption" of a steady 20 per cent increase. BOAC hoped that traffic for the year 1961-62 would show an increase of 5 per cent over 1960-61 compared with the 14 per cent estimated before the Board. Even this might be rashly optimistic as five months of the year were already gone and the four month summer peak normally accounted for two-thirds of the annual traffic.

Sir Basil quoted revised estimates of traffic at the now expected reduced growth rates, and pointed out that the lower figures, compared with those quoted at the original hearing, meant that BOAC's margin of capacity would be more than originally expected. Other operators had greatly increased their capacity and, with load factors of 50 per cent, compared with 70 per cent a year ago, it was a case of "too many seats chasing too few passengers." With new jet equipment still being delivered to other operators the capacity surplus was likely to continue.

It was unlikely that sufficient new traffic could be attracted by a general reduction of fares to redress the position and there had been no agreement on fare cuts at the meeting of IATA in July. The marginal economics of the route did not justify general fare reductions but group fares and "tour-basing" fares were being considered although there was a danger of attracting passengers away from normal fare categories. European fares were to be raised by 5 per cent on November 1 because of disappointing traffic. It was thus possible that the fare reductions of 10 per cent in 1963-64 and a further reduction of 5 per cent in 1965-66 which BOAC had expected to stimulate traffic would not materialize. The greater fare reductions which the Board—on no evidence—had foreseen were most unlikely.

Sir Basil said that BOAC were therefore proposing to reduce their costs by reducing capacity on the east coast route by 7 per cent in 1962-63, since their current capacity was more than enough to deal with the total expected British share of the traffic in 1962-63. This would be the first occasion in the history of the route of a capacity cut but load factors were currently 20 per cent below normal so that a 40 per cent traffic increase would be necessary to restore a 70 per cent load factor on the existing capacity.

Concluding his evidence, Sir Basil said that the Board seemed to have considered irrelevant the difference in traffic growth rates estimated by BOAC (17 per cent) and Cunard Eagle (20 per cent). He submitted a table based on these two rates of growth showing that the difference alone represented three aircraft in 1965-66, four and a half in 1966-67 and six in 1967-68, or capital at risk of £9m, £12½m and £18m in the same three years. The revenue equivalent of the difference would be £6½m in 1965-66 and £13m in 1967-68. This year's figure, Sir Basil stated, indicated an average increase rate of not more than 15 per cent.

Mr Gardiner began his cross-examination by questioning Sir Basil on the traffic estimates submitted to the Board in comparison with the revised figures for future traffic submitted at this hearing. He questioned the "cleaning" which had been applied and suggested that BOAC's estimates for 1959-60 and 1960-61 traffic on the route had been materially exceeded. Mr Fisher submitted that this was improper cross-examination and quoted Regulation 14 as his authority for submitting that questions should be confined to new matters introduced in evidence at the appeal.

Mr Gardiner then quoted IATA figures for traffic between the USA and Europe, which showed increases of 4.5 per cent and 4.6 per cent for the April-June and April-July periods of 1961, compared with 1960, and Ministry of Aviation figures showing 12½ per cent increase for the period January-June 1961 compared with 1960. Finally, quoting figures for BOAC, UK - USA traffic for the months January-March 1960 and 1961 inclusive, he asked Sir Basil to confirm the indicated increase of more than 30 per cent during these three months for which, he pointed out, BOAC had not quoted statistics. Mr Gardiner suggested that the figures showed that the 17-day excursion fare had achieved the object of levelling out traffic. Sir Basil did not agree that this had been the object of the fare which had been, he said, intended to produce an overall increase of traffic. Sir Basil agreed, however, that the 30 per cent increase in the months January-March 1961 had been more than BOAC had expected.

Westbound Traffic Increasing

Mr Gardiner also suggested that figures for traffic carried by BOAC since May would be misleading because of the effects of strikes and asked how much these had cost the corporation. Sir Basil quoted losses of £1½m directly connected with the services not operated, plus a further £1m to £1½m in consequential losses in forward bookings. He confirmed that 27½ per cent of the Boeing 707 payload was available for mail and cargo, did not dispute IATA figures for North Atlantic increases of 30 per cent in mail and 34 per cent in cargo during the months January-July 1961 compared with 1960, but could not immediately quote figures for BOAC mail and cargo to the east coast. (These were quoted the following day; freight January-June, up 31.4 per cent and mail February-June, up 3.4 per cent.)

Referring to paragraphs "you didn't read" from extracts from articles in *Airlift* which had been submitted as evidence by BOAC, Mr Gardiner quoted a passage implying that Atlantic fares were too high, and suggested that nationalized airlines were less inclined than the independents to reduce fares. A further passage from the same article indicated that westbound traffic was increasing—which Sir Basil conceded was so —by about 4.5 per cent. Asked about an article in *Travel Trade Gazette* in which BOAC were quoted as saying that westbound Atlantic bookings for Autumn were running about 10 per cent above last year, Sir Basil said that he did not read *Travel Trade Gazette* but did not disagree with the statement.

Mr Gardiner then turned his attention to load factors and, having established that load factors achieved in the years 1955-59 were 62-67 per cent and that the break-even load factor over the same period was approximately 65 per cent, suggested that Boeing claimed a break-even load factor of 30 per cent for the 707 while Cunard Eagle, more conservatively, assessed it at 40 per cent. Sir Basil said that BOAC put the figure at 50 per cent and Mr Gardiner suggested that this meant that BOAC could operate their Boeing 707s at 50 per cent load factor without losing money, while any sudden spurt of traffic would give an enormous profit.

Finally, Mr Gardiner asked whether Sir Basil still felt that, as he had said at the hearing by the Board, long term trends were more important than short term movements in considering traffic prospects. Sir Basil agreed and Mr Gardiner then asked whether he did not feel that April and May figures covered too short a period on which to base a forecast of a 5 per cent increase for the whole year. When Sir Basil said that IATA statistics had also been taken into account Mr Gardiner

pointed out that traffic forecasts for seven years were in dispute and that so far only 8 per cent of the American population had travelled abroad while currency restrictions had prevented UK residents visiting America in any numbers. He suggested that next year might reverse the recent trend and Sir Basil said he thought that would be a wonderful thing.

Mr Fisher began his short re-examination of his witness by going over the "cleaning" processes applied by BOAC to traffic figures to establish that the forecast for 1960-61 had borne a reasonable relation to the actual traffic achieved and formed a sound basis for forecasting future probabilities. He also established that the more promising figures for North Atlantic traffic, which had been quoted by Mr Gardiner and agreed by Sir Basil, included traffic to all destinations in North America and that the figures for January to March 1961 had covered certain services not operated in 1960. Questioned by Mr Fisher about orders placed by independents for new British aircraft Sir Basil did not think that an independent company like Cunard Eagle would have the resources to place a development order, as had BOAC, for an aircraft such as the VC10 or Super VC10.

Cunard Eagle's Case

Mr Gardiner then began his presentation of the case for Cunard Eagle Airways. He said that the British Overseas Airways Act of 1939 and the Civil Aviation Act of 1946—to which Mr Fisher had referred—had both been repealed by the Air Corporations Act 1949 on which he would base his initial argument. Before the ATLB Mr Fisher and Sir Basil Smallpeice had strenuously maintained that BOAC had a duty to operate certain routes. Under Section 3 of the Act of 1949 they had *powers* to operate; the only *duty* laid on them by Section 3(3)(i), was to exercise their *powers* to the best of their ability and develop services to the best advantage and at reasonable charges. The Board had therefore been quite right to hold that BOAC had no duty to fly any particular route.

Referring to the play which he said had been made before the Board on Mr Duncan Sandys' statement that he did not intend to allow others to reap where the corporations had sown, Mr Gardiner said that the Minister had found himself faced with the necessity to honour an election pledge to set up a body to adjudicate on licence applications, before whom the independents would have the same rights as the corporations. This was necessary because the independents could not continue to survive on scraps, as the Minister had explained in outlining the provisions of the Bill, stating that it was intended to permit them some security in forward planning and to allow them to continue the valuable service they had rendered to British civil aviation in the past. In short, the Minister had reassured the corporations while seeking to honour the election pledge to the independents and, having spoken fair to both parties had left the Board to sort things out. The only real direction given to the Board was in Section 1(1) of the 1960 Act—that it should further the development of British Civil Aviation.

Cunard Eagle, continued Mr Gardiner, were the obvious choice for a trans-Atlantic licence and they had been granted one in such restricted terms that BOAC would continue with a complete north Atlantic monopoly except for one flight daily to the east coast of America. The effect of this licence would be that, in six years' time, Cunard Eagle would have the right to compete for less than a quarter of the *increase* in traffic on the route over the period. If, after 15 years of coddling and subsidies, BOAC could not face a 25 per cent competitor for traffic which did not yet exist, they could not be much good. Mr Gardiner was about to deal with BOAC's points in objection when Mr Fisher intervened to say that BOAC would not persist in the objection in so far as it applied to Manchester and Prestwick and to points other than New York in the USA.

Mr Gardiner resumed with a reference to what he said had been disrespectfully referred to as the gramophone record of the corporations. This, he said, went "we have entered into commitments to buy all the aeroplanes required to carry all the traffic which we envisage on this route for so many years and nobody else should therefore be allowed on it." The Board's problem was that if the record was right no licence could ever be granted. It was one thing to protect existing traffic but to take account of all past and future aircraft orders would mean protecting all future traffic for ever. The orders for VC10's on which BOAC were relying were not based on the estimates which had been produced but on estimates for all routes. The licence granted was equivalent to two Boeings and that was all that should concern the Commissioner. Cunard Eagle were not relying on the order they had placed in March for Boeing 707s. Yet BOAC in the middle of the hearing by the Board, had ordered three additional Boeings and were thus in exactly the same position as Cunard Eagle. The £100m orders for VC10s was irrelevant.

Mr Gardiner quoted from the transcript of the hearing to show that cross-examination of Sir Basil Smallpeice at that time, and his answers to questions from the Board, had shown that, although BOAC had maintained that the three Boeings were not ordered for the Atlantic, their aircraft were pooled for all routes. Further questions from the transcript showed that BOAC expected to operate 600 Atlantic charter flights in the current year in addition to their scheduled services. The Board, Mr Gardiner submitted, were in error in taking BOAC's commitments for aircraft procurement into consideration, but right to say that they were not grounds for refusing a licence.

Turning to "the rather tedious subject of intergovernmental agreements," Mr Gardiner said that Cunard Eagle contended these were not a matter for the Board's consideration as they had been intentionally omitted from Section 2(2) of the Act of 1960 and reserved to the Minister under Section 2(3). In this case the Minister had not directed the Board to refuse a licence and there the matter should end. However, if the Board were to consider this aspect of the objection, their decision had been right.

The evidence of Mr Beckman (US Attorney to Cunard Eagle) and extracts quoted from the direction of the US Secretary of State to the Civil Aeronautics Board on the designation of a second British operator on the Bermuda-Bahamas route, made it clear that the US Government was obliged to permit multiple designation of British operators until such time as the agreement with the United Kingdom was denounced or revised.

Mr Gardiner opened the fourth day of the hearing by reverting briefly to the question of financial commitments. He suggested that it might clarify the issue if the Commissioner were to assume that BOAC had pleaded some quite astronomical commitment—say £500m—on aircraft for the Canada route. If the Board had wrongly understood this to be only £5m it would be irrelevant as the Board had refused a licence on that route. The only aircraft relevant to the present hearing were those of capacity equivalent to the licence issued—two Boeing 707s. Both BOAC and Cunard Eagle had, quite reasonably, taken the risk of ordering aircraft while the outcome of application A.1000 was unknown; Cunard Eagle were not relying on that commitment, nor should BOAC.

Mr Gardiner then reverted to bilateral agreements, and suggested that the evidence of both Mr Ashton Hill and Mr Beckman had indicated that it was most unlikely either that the CAB would refuse Cunard Eagle a permit, or that a third American operator would be designated on the route. Even Sir Basil Smallpeice's evidence, Mr Gardiner suggested, had indicated that the CAB would not recommend refusal of a permit, that the US President would not refuse one, that there was little likelihood of a third carrier being designated and that there was no control of capacity under the Bermuda agreement. Mr Gardiner submitted that the Board should not have ruled on this matter but, in any case, had reached their decision after hearing all the evidence and, as their findings showed, after consulting with the Minister; what, therefore, was the point of an appeal to the Minister against the decision?

Here the Commissioner interposed the comment that the situation was reminiscent of W. S. Gilbert in that BOAC seemed to be appealing to the Minister, in his judicial capacity, to reverse a decision taken by the Board after receiving advice from the Minister in his administrative capacity! In any case the Board's decision was in Cunard Eagle's favour so why, in effect, was Counsel for Cunard Eagle making such a fuss about it? Mr Gardiner pointed out that his arguments were directed against the appeal by BOAC from the Board's decision; the decision was, he maintained, wrongly given but right in substance. Dealing next with BOAC's claim that no need for the service had been shown, Mr Gardiner suggested that this was a route on which the need was manifest. In five years' time there would be one million additional passengers for whom no aircraft *at present* existed. If, in showing need, you had to consider additional capacity which BOAC might provide, you were back to the "gramophone record." Need had to be demonstrated only if there was no existing service or if the traffic was stationary.

Will Diversions be Material?

On material diversion, Mr Gardiner said Cunard Eagle conceded that there would be diversion but did not agree with the Board that it would be material. Mr Ashton Hill had not agreed, as suggested by Mr Fisher, that proof of no material diversion was a precedent requirement to the granting of a licence and Cunard Eagle maintained that this was not the case. While Cunard Eagle had claimed only that no material number of passengers would be diverted from BOAC, Sir Basil Smallpeice had claimed that all Cunard Eagle's passengers would come from that source; it was for the Board to decide between the claims. On the BOAC claim of "wasteful duplication" Mr Gardiner submitted that duplication would only be wasteful if it meant the operators running their services at a loss; where there was traffic to support more than one the duplication would not be wasteful.

On the subject of the so-called "British share" of traffic, it was not true that Mr Ashton Hill had agreed this was 43 per cent of the total, although he had suggested this as the percentage likely to be carried by BOAC in demonstrating how much would remain. BOAC had never approached 50 per cent of the British/American traffic and the Americans would not have a leg to stand on if they objected to the designation of a second British carrier. Mr Gardiner maintained that the true traffic figures showed a sharp increase over the last two years. The Board had to decide whether traffic was likely to decline, stay steady or increase, and, if it was likely to increase, by how much.

There was little final difference between BOAC's estimate of an aver-

Lord Douglas, BEA chairman, lays the foundation stone for the corporation's new £3.5m London Air Terminal; on the left is Mr. E. R. Hale, chairman of Holland & Hannen and Cubitts (Great Britain) Ltd, builders of the terminal. There will be a basement garage for 140 cars

AIR COMMERCE...

age rate of increase of 17.3 per cent and Cunard Eagle's 20 per cent, and the Board had decided that the many variables made forecasting so uncertain that the difference of 3 per cent between the two rates was irrelevant. At BOAC's lower rate of increase passenger traffic would reach the same figures about one year later than at Cunard Eagle's 20 per cent and would exceed the million by 1966-67. The Board had considered (not assumed) the *possibility* of further fare decreases or trade recessions affecting traffic either way; the overall picture was important, not short term results. Actual traffic had exceeded BOAC's estimates for 1960-61 by 60,000, partly due to the unexpectedly big effect of winter fare reductions.

Mr Gardiner suggested that the Board, in considering the implications of Section 2(2) of the Act, had decided that there would be no wasteful duplication, that there might be diversion of traffic from BOAC and that the Cunard Eagle sales organization might attract entirely new traffic. The report of the International Research Bureau to the American President had indicated that the designation of a second US flag carrier generally resulted in increased total US traffic and the Board had similarly decided that two British carriers were together likely to obtain more traffic than BOAC alone.

Mr Gardiner continued his speech with the submission of a list of advantages which might accrue to British civil aviation from the designation of a second British carrier on the Atlantic. (1) Competition *per se*, which had been mentioned by the Minister in introducing the Bill to Parliament. Not, Mr Gardiner suggested, the spurious "competition" which existed between BEA and Air France, but competition between two British carriers which would lead to better service to the public. (2) The creation of additional British traffic by sales campaigns designed to persuade additional British travellers to visit America and Americans to fly in British aircraft. (3) The benefit to the British aircraft industry of having another potential British customer; BUA, as a result of the 1960 Act, had ordered BAC One-Elevens. (4) and (5) both resulted from BOAC having usually underestimated traffic increases, having had to wait for Treasury permission to purchase equipment with the result that they usually had "too little too late," and the possibility that delivery of their new fleet of VC10s and Super VC10s might be delayed through further design changes and unforeseen "bugs." Advantage (4), therefore, was that of having a second carrier with a different type of aircraft who could fill the gap, and (5), should BOAC have labour troubles, not all the £1½m of lost traffic would go to foreign carriers. Other advantages were (6) the strength of British representation in IATA would be increased by the improved status of independents already members of the Association, and (7) help that the Corporations and independents could give one another. Mr Gardiner suggested that, when the dust had settled, two British carriers would always co-operate in helping one another against foreign competition. Finally, Mr Gardiner invited the Minister to consider traffic figures: BOAC estimated that there would be 460,000 more passengers to be carried in five years' time; Cunard Eagle had been granted a licence, equivalent to 65,000 passengers annually, for 15 years. BOAC would therefore retain all their present traffic and have to compete for only one-eighth of the *increase*.

BOAC would presumably be operating ten or 11 flights per day in two years' time, compared with the one licensed to Cunard Eagle; the latter were bitterly disappointed with the scale of the licence granted and, but for the time element, might well have cross-appealed against this sample of the "competition on level terms" which the Minister had promised. Mr Gardiner submitted that there were no grounds for BOAC's claim that the Board should not have granted the licence and the appellants had a heavy responsibility in seeking to persuade the Minister that the Board's decision, reached after giving their expert consideration to the mass of evidence which they had so patiently heard, was wrong.

Finally, Mr Gardiner asked the Commissioner to recommend to the Minister that an early decision was of importance to Cunard Eagle. If their licence was upheld they would then have to secure certification by the CAB and set up machinery for passenger bookings on a route where reservations were commonly made six months ahead. Mr Gardiner suggested that the Commissioner should recommend to the Minister that there were no grounds for disagreeing with the decision of the Board.

[To be continued]

BREVITIES

Riddle Airlines have taken delivery of their seventh Argosy freighter. This completes their order.

MEA is negotiating the charter of a Viscount 779 from Fred Olsen Airtransport Ltd, according to *Interavia*.

Air France has received government approval to negotiate contracts for four more Boeing 707-328Bs and seven more Caravelle 3s, bringing the fleet totals up to 24 Boeing 707s and 40 Caravelles.

BOAC has been appointed general sales agents in the UK for Turk Hava Yollari. The Turkish airline is shortly to start a thrice-weekly Ankara - London service via Istanbul, Vienna and Frankfurt using Viscounts.

The German charter operator Bavaria Fluggesellschaft is operating daily scheduled cargo flights on the Hamburg - Bremen and Frankfurt - Bremen routes for Lufthansa, using DC-3s acquired from Lufthansa at the beginning of this year.

Avio Linee Siciliani is a new Italian carrier that has just acquired three Herons to operate a domestic network in Sicily. Its share capital is currently held by the Banca di Sicilia, the Catania Savings Bank and the Catanian Chamber of Commerce. Alitalia is shortly to acquire a minority holding in the new carrier.

Since October 1, all Air France services into London have used Heathrow, and the airline has ceased using Gatwick.

Highest utilization of any Boeing 707 operator is that of Continental, whose five 707-124s have achieved an average of 11.09 hours a day; one of these aircraft has now flown 9,310 hours.

Trans Atlantica Argentina, the Buenos Aires independent, is to extend its current BA - Geneva route to Tel Aviv this month. The carrier has three L.1649A Starliners acquired on lease-purchase from TWA.

Air Corse is a new carrier licensed to operate passenger and cargo services with Bristol 170s between Nice and Corsica and Nice and Italy, as well as freight charter flights between metropolitan France and Corsica.

Western Airlines have ordered three additional Boeing 720B medium jets to supplement the four of this type it already operates; Western also have two Boeing 707-139s originally destined for Cubana and leased from Boeing.

According to *Interavia*, the Luxembourg-based charter operation of Seven Seas Airlines Inc is reportedly in liquidation and two trustees have been appointed. Two DC-4s and a C-46 belonging to the company are said to have been seized, as well as the company's hangar.

The FAA has abolished its requirement for landing flares to be carried on aircraft operating over water at night. Accidental discharge of flares has caused fire hazards at airports, and flares have been suspected of intensifying fires after crashes.

New York Airways have taken delivery of the first of their five Boeing-Vertol 107s and will use it initially for crew training and route proving. FAA certification is expected in time to allow scheduled operations to begin early in January.

Mr Glen Taylor, the new owner of President Airlines, said in Los Angeles that at present the airline had only two aircraft, but he intended to increase the number to 20, at a cost of $20m (£7m). He claimed that the recent delay of a President DC-6B at Shannon for five days pending payment of fuel bills and other expenses might have been partly due to the transfer of the airline's ownership.

Mr D. J. Coxhead, AFC, ARAeS, has been appointed technical secretary to the British Air Line Pilots Association in succession to Mr L. F. E. Coombes, who has left the Association after seven years. After serving an engineering apprenticeship Mr Coxhead joined the Royal Air Force, and he has flown some 3,600 hours on almost 100 types. He was awarded the AFC in connection with his duties as a test pilot in the RAF. Before taking up his present appointment he was with British United Airways' engineering division.

This view shows the neat installation of the Turboméca Astazous in the Potez 840. The American firm Turboflight Inc has just placed a firm order for no fewer than 120 of these new French executive transports for delivery at the rate of 24 per year. Local-service carriers may come to show an interest in the 840

AOA Pennine Conference

NON-STATE AERODROME OWNERSHIP: WHO PAYS?

FROM Harrogate, that comely Yorkshire spa built some 600ft up on an eastern slope of the Pennines, the road south-west past the Leeds / Bradford Airport at Yeadon, 11 miles away, crosses a valley then climbs again, to the airfield elevation of 678ft a.s.l. Down below (comparatively speaking, for the West Riding never admits of depressions), to the south-west and south-east respectively, lie the busy cities of Bradford and Leeds, each six miles from the airport they jointly own; and last week they were joint hosts to the Aerodrome Owners' Association, whose deliberations were held in the elegant surroundings of Harrogate.

As is usual with the AOA, the two days' agenda was productively filled. The delegates (over a hundred of them, from as far south as Folkestone to as far north as Carlisle) heard and questioned four speakers on subjects highly relevant to aerodrome owners: Mr John M. Wilson, a Deputy Secretary at the Ministry of Aviation, on *Government Policy Relating to Non-State Aerodromes*; Capt J. A. Cameron of the BEA Helicopter Unit on *Planning the Next Stage*; Mr R. S. F. Edwards, general manager, London Airports, on *Economics of Aerodrome Management*; and Mr G. H. G. Threlfall, managing director of Autair Ltd, on *Potentialities for Charter Passenger and Freight Traffic*. Delegates also saw a couple of instructive films (about helicopters and about the use of aircraft in out-of-the-way-places), enriched their stock of Yorkshire stories and Leeds/Bradford anecdotes at civic luncheons in each of these textile cities, were entertained to tea in the Royal Baths at Harrogate and to dinner by Shell-Mex & BP; and inspected the installations at Leeds/Bradford Airport under the able guidance of the commandant, Mr G. P. Seller.

Apart from the interest of different venues and the renewal of old acquaintanceships, these annual AOA conferences provide an opportunity for personal encounters between aerodrome operators and "the man from the Ministry" or the top executives of airline companies; and the question periods or private discussions are often as useful as the prepared discourses. At the back of many minds in this year's conference was the recent Government White Paper on *Civil Aerodromes and Air Navigational Services*, with its policy statement that the ownership and management of State aerodromes should be decentralized, and important corollaries about provision of technical services and tests of indispensability to decide whether a local authority should receive Government aid in running its airfield. Proposals contained in the White Paper had previously been discussed with the AOA and the Association of Municipal Corporations; and Alderman E. Fitzsimons of Manchester made an earnest plea on the last morning of the conference for the maximum co-operation at this critical time between the AOA and the airport committee of the AMC, so that the latter would have the benefit of professional advice.

Stern Economic Challenge

It was on the White Paper that Mr John Wilson took his stand, emphasizing that though it might seem strange that the Government had "decided to contract out of the fascinating business of running aerodromes" this was mainly because conditions had changed so much since the war. He admitted that he would like to cheer up all the owners present by saying the MoA were eagerly awaiting their applications for assistance; but in the context of the stern economic challenge the country was facing, certain tests had to be applied: is the aerodrome an essential link in the national transport system? is the cost of providing it more than the local community can bear? A further aspect was the prospect of being able to pay its way in a reasonable time. On technical services, he said the White Paper suggested a new exception: that the Government might provide some at aerodromes where they were at present provided by the owner, or continue to supply them at some aerodromes which don't qualify for State support.

Questions fired at Mr Wilson showed that by no means all owners fitted into a neat White Paper pattern. Mr C. M. Newton of Sywell, a founder member of the AOA (and whose winning of a Paul Tissandier Award was announced by the Association's chairman, Alderman F. H. O'Donnell, at the civic luncheon in Bradford), wanted to know how the private owners fitted into the new picture. He was told the Government was well aware of their problems, but at present doubted whether any of their aerodromes would satisfy the tests; there was also the "political issue" of how much taxpayers' money you should give the private individuals. Mr H. D. A. Robertson of Carlisle put the case of a new owner, his city having recently resuscitated an RAF aerodrome, and was told there was nothing incompatible between the MoA giving help and assistance and applying tests for the taxpayers' money. Mr J. C. Swaffield of Blackpool queried as to how "indispensability" was to be judged; later the AOA vice-chairman, Mr R. Birkett of Skyways, said he would rather see "public utility" used as the basis for judging an aerodrome's claim for support.

From aerodromes to helicopter platforms over the Thames: for in Capt Cameron's paper the delegates heard a description of plans for a landing site by the Victoria Embankment, where HMS *Discovery* now lies at anchor. For good measure, Capt Cameron had brought with him a model in the Bristol 171 in which he flew up from Gatwick with 1st Off J. H. Summerlee: depicting the platform (to be 180ft × 200ft) it showed also a Boeing Vertol 107 and Sikorsky S-61. Capt Cameron stressed the virtues of the gas turbine engine in helicopters, including lower noise and vibration levels and lower passenger seat-mile costs (10d against 30d at present). He indicated BEA's interest in the London - Brussels - Paris triangle, and their plans for Penzance - Scillies helicopter operations. Oban - Ft William was another route they had in mind. After being reminded by Mr G. A. Harvey, the director of Manchester Airport, that Mr Peter Masefield at a previous AOA conference had talked in terms of 4d per passenger seat-mile in a 64-seat Rotodyne, Capt Cameron admitted that costs were "still very high," but after the Boeing Vertol 107 got into service they would probably get them down to 6d a seat-mile. He told Mr J. A. Gordon, commandant of Birmingham Airport, that he reckoned that "in about three years" helicopters would attain fixed-wing regularity.

Financing Heathrow

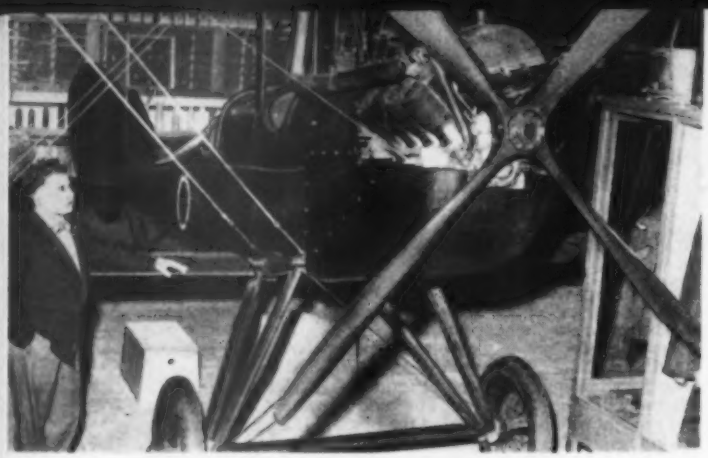
Economics play a large part in aerodrome management, and Mr R. S. F. Edwards, who as general manager of London Airports handles the largest UK aerodrome expenditure, had much of interest to tell delegates about the financing of LAP. Giving figures in percentages, he said that the largest item in the expenditure was for salaries, superannuation, staff training, etc (34 per cent), while the largest slice of income (42 per cent) came from landing fees. Speaking of the latter, he emphasized the services provided by London, and said it would be valuable if international agreement were reached on what could be included under this heading and what charged for separately. On staff, he said the cost averaged out at £1,000 per man p.a.; and to maintain staff on a 24hr day, seven-day-week basis, covering sickness and holidays, needed four or five men for every man, working out at £4,000 - £5,000 p.a. This figure, as the cost of one man, "terrified" Mr Birkett: he asked what could be done about overtime; could the week be a seven-day instead of a five-day one? Mr Edwards said in reply that their overtime bill was "practically 50 per cent"; he didn't think the seven-day week practice of some Continental countries could be introduced here unless the Common Market brought it about.

The Common Market figured in Mr Threlfall's remarks on passenger and freight traffic by charter companies, when he said that if Britain were to survive economically in its increased tempo, it was important that independent companies should play their part in a strong merchant fleet. He had been emphasizing the size and variety of charter freight transport—although, despite our need to win overseas orders, only about 5 per cent of goods leaving this country went by air; and in references to private and executive flying, Mr Threlfall criticized the shortage of suitable airfields close to the major population centres. In the third aspect of his paper, passenger flying by charter companies, with special reference to inclusive tours and coach/air services, he stressed that operational and maintenance standards were exactly the same as for national scheduled carriers.

Referring specifically to his audience of owners, Mr Threlfall urged them to be "realistic"; it was no good expecting that a considerable number of airfields in England were going to be able to support "a network of scheduled services" to all major points in Europe: but as the major airfields were already fairly saturated with trunk route operators, the smaller airports should be used for the type of flying developed by the independents—such as pure charter, inclusive tours, rail/air or coach/air services, car and vehicle ferries.

In thanking Mr Threlfall, Mr Birkett said that it was "a joy to listen to an expert speaking on his own subject." The same might be said of other speakers at the conference, and it is impossible in a short report to do justice to their papers. More detailed reference may be made in a future issue of *Flight*. The secretary of the AOA, Sqn Ldr A. W. Day, was particularly thanked by the chairman, Ald F. H. O'Donnell, for his work in organizing the conference and for his "apostolic peregrinations" throughout the year on behalf of the association.

H. W.



The B.E.2c in the War Museum, Ottawa, described in a letter below

Correspondence

The Editor of "Flight" is not necessarily in agreement with the views expressed by correspondents in these columns. Names and addresses of writers, not for publication in detail, must in all cases accompany letters.

Commemorating G. H. Handasyde

DURING the lifetime story of aviation seldom have we had the privilege of staging a flight to the memory of one of its oldest pioneers. This flight is being inaugurated in honour to the late G. H. Handasyde, OBE, who took a leading part in the earliest days of flying and who was responsible for the design and construction of many of the world's finest aircraft dating from 1908, when he produced his first monoplane.

Over his many years' experience in aeroplane design and construction he was always a strong believer in the superior efficiency of the monoplane and was very much in favour of the rear-engined machine, a type which was now becoming predominant. Some people were quick to realize the advantages of the rear-engined aircraft and today we see very good evidence of that fact. Handasyde himself believed in strength of construction and his machines were very good examples, having the reputation of being built to last.

During the period 1936-37 he became responsible for the design of a small three-seater cabin monoplane fitted with retractable undercarriage, which was acclaimed as one of the fastest light machines of its class. The machine became known as the Eagle and was sold to many countries, including the Commonwealth of Australia.

The proposed tribute to Handasyde is to organize a commemoration flight from Australia to this country by an Eagle monoplane which has become available in Australia, where it has been in regular service right up to the present moment.

This flight is being made as a memorial tribute and it is very gratifying to mention that a most valuable contribution has been received from de Havilland, who themselves are one of the oldest pioneering concerns. They have generously offered to service the engine and provide the necessary spare parts, free of charge, and are also willing to provide a full kit of spares to be carried on the flight from Australia to here.

This kindly gesture has been warmly received and is considered as a most helpful step towards the formation of this flight. The flight offers many opportunities and in itself lends a unique way of advertising the products of others who are engaged in commercial trade throughout the world.

It is hoped that this valuable contribution will serve as a stimulus to the industry and others in making an endeavour to support this worthy cause in commemoration of one of their brother pioneers.

Edinburgh 7 S. H. HANDASYDE

43 Sqn Pilots

I HAVE recently been carrying out a little research into the history of No 43 Squadron and wonder if any ex-members, or your readers, could add to my knowledge.

No 43 Squadron had a fair proportion of exceptional pilots in both wars, and I would like to know a little more about, in particular, C. F. King, H. W. Woollett and J. L. Trollop. King, unfortunately, was killed at Sedgeford on January 24, 1919, but H. W. Woollett, who remained in the R.A.F. to command No 43 by 1928, was recalled in 1938 to serve again. John L. Trollop, repatriated in June 1918 after being wounded in air combat and taken prisoner, was, I feel sure, also back in the RAF in the last war.

Any information, sent c/o the Editor, would be appreciated.

Bridlington, East Yorks JAMES L. DIXON

Those Asymmetric Hampdens

RE Roger Bacon's picture in September 14 issue, of the two Hampden bombers: perhaps the designer thought the bend in the fuselage might assist asymmetric flight! Think how this would also help "landing on one engine," the term beloved by air reporters and air experts of the daily Press. Has anyone ever seen this feat accomplished? I am still waiting for the day when an engine comes out and the pilot runs over it!

Coventry R. E. NICOLL

BUA's Britannias

IT is with regret that I put pen to paper in order to lodge a complaint. In your report on page 519 of last week's [September 28 issue, of BOAC Britannias for BUA, please get the registrations correct. It was G-AOVI that had just come off Check 4 and G-AOVE which went out after a Check 1 in BOAC livery.

I am not a rivet counter by any means, but . . .

Teddington, Middx. M. FULLER
(Fitter, South Pen, BOAC)

Dog-fights

IN *Flight* for September 21 Mr Heinz J. Nowarra writes about the dog which fell with his master, on June 27, 1917. The same thing happened in Holland during the Second World War on the Luftwaffe air base of Leeuwarden. The commander of a Me109 squadron always took his dog with him into the air.

One day—about March 1942—a Hampden of Coastal Command appeared over Leeuwarden. The Me109 took off to attack the British bomber, but the German fighter was shot down. The Luftwaffe pilot came down with his Me109, together with his dog. Both were dead.

Maarn, Holland HUGO HOOFTMAN

Ottawa's—and Sowrey's—B.E.2c

DISCOVERING a B.E.2c in the War Museum in Ottawa was quite a surprise. On entering the museum the aircraft is not visible until one is halfway down the narrow building; then one sees it standing fully rigged, partly obscured by the internal structure around which it had been assembled.

It is known that very few B.E.2cs remain in existence. To the writer's knowledge there may be another specimen in custody of the Imperial War Museum, probably not in condition for exhibition [on the contrary, permanently on show—Ed.]

On first inspection the most striking impression was that with little effort the Ottawa aeroplane could be made airworthy, so complete does it appear. The workmanship that was put into the rebuilding must be highly commended. The curator of the museum, Mr Murray, gave invaluable assistance in the quest for information. All records were made available for inspection and study.

The B.E.2c, serial number 4112, was constructed by the British & Colonial Aeroplane Co in 1914. Probably it originally had a Renault vee-eight engine of 70 h.p. This aircraft, the museum records claim, is the actual machine flown by 2/Lt Sowrey, RFC, 39 Sqn, when he shot down Zeppelin L32 over Billericay, Essex, from which there were no survivors, on the night of September 23-24, 1916.

How it managed to survive the war and find its way to Canada was impossible to discover. Mr Murray volunteered that many such souvenirs were collected by such ways and means that it is best there is no record.

The reconditioning of the machine was carried out by 6 RD Trenton, with the other vintage aircraft that were displayed throughout Canada to commemorate Canada's 50th anniversary of flight.

The engine now fitted is not the original but a RAF [Royal Aircraft Factory] 1a vee-eight engine of 90 h.p. The dimensions of the crankcase are such that interchangeability of the engine appears to have been a good design feature of those days. This engine has been supplied, on loan, by the Imperial War Museum to complete the aircraft for display purposes.

It was noted that the carburettor is a Claudel-Hobson type, with double choke, fed by a single central circular foot chamber, attached to the bottom of the volute casing at the rear of the engine. A single magneto is fitted to the back of the crankcase, and most notable of all is the side induction valve and overhead exhaust valve fitted to the individual air-cooled cast iron cylinders. On moving the propeller one could feel that the engine still had good compression. All in all, it looks in very good condition.

What gives the aircraft its good appearance is the wonderful job that has been made of the fabric recovering, even being authentic enough for the edges of the reinforcing tape to have been frayed before doping. What could be seen of the fuselage indicated that most of the structure was original except some wooden numbers around the engine bay. Also surprising was the use of so many

original nuts and bolts. Very few American-size bolts had been used on the rebuild; the ones most apparent were the bolts attaching the wing struts. The bolts and nuts on the elevators were of modern type, indicating that probably the elevators had been completely re-fabricated. Confirming this assumption was the use of Tiger Moth king-posts, obviously wrongly positioned.

The wing bracing wires are all of recent manufacture, being made, as were the originals, of $\frac{1}{16}$in flexible control cable, neatly spliced and adjusted by turnbuckles.

The two fuel tanks are still in position, one forward of the front cockpit under the top coaming and the other, the main tank, located on the floor of the front cockpit. Both tanks appear in good condition and free from corrosion.

The instrument panel in the rear cockpit is of recent manufacture and not very authentic. Instruments fitted are an air speed indicator, r.p.m. indicator (date-stamped 1929) and an altimeter of approximately the same age. No sign of any throttle lever or linkage could be found or any indication that one had been fitted. A single-pole electric light-type switch is attached to the port side of the rear cockpit but all wiring has been removed. It was noted that the engine now fitted would normally be controlled by a throttle lever and linkage.

The pilot's seat certainly lacks comfort and is made of heavy gauge steel, presumably to give a degree of protection to the derrière from bullets. No windshields are fitted, as was the custom of those days. The only other controls in the cockpit are the control stick, rudder bar and fuel on-off selector.

The undercarriage appears to be the original excepting the new motor-cycle-size tires which are fitted to the thin wire wheels. Shock absorption is by bungee cord wrapped around the axle.

The propeller, of recent origin, looks very authentic, although doubts exist whether it would serve any purpose other than to be a good copy of the original.

Ottawa H. J. ("Titch") JENKINS

CORRESPONDENCE IN BRIEF

Flt Lt J. R. Hawke of RAF Wattisham, Ipswich, Suffolk, is looking for information which will assist in the restoration of a Messerschmitt Me109G, number NORN228, on the station. He would be glad to receive "any information at all" as to markings, colour schemes, serial numbers, makers' handbook, technical data, servicing instructions, etc, relating to Me109G airframes and engines.

Mr W. E. Thorpe writes from 188 Park Road, Kingston, Surrey, to say that he has for disposal about 600 copies of *Flight*, *Aero*, *The Aeroplane* and a few *Aeronautics* dating from 1909 to 1914, which he wishes to dispose of "to someone really interested in the history and progress of aviation." Mr Thorpe, who was a mechanic at Hendon in 1911 and is at present with Hawker Aircraft, is anxious that his copies should fall into the right hands, "where their historical value would be appreciated."

The Pakistan International Airlines night tourist fare quoted by Mr James Gilbert in a letter published last week appeared, owing to a transcription error, as 2s 8d per mile return. This should, of course, have read "2.8d per mile return."

THE INDUSTRY

Ultra Telecommunications Division

ANNOUNCED last week was the formation of a telecommunications division of Ultra Electronics Ltd. It will be headed, as operations manager, by Maj Gen E. S. Cole, CB, CBE, formerly Director of Telecommunications at the War Office and currently president of the Radio Society of Great Britain.

The new division, which will have the use of the extensive telecommunications development laboratories and manufacturing plant at the company's existing factory at Western Avenue, London W3, will also have at its disposal the facilities of two recently acquired companies, W. S. Electronics Ltd and Trix Electronics Ltd.

Licensing arrangements have also been established with a number of companies in the United States and on the Continent. These include research and development facilities with 18 American companies associated with the Electronics Capital Corporation.

Aerad in Frankfurt

THE Aerad Printing and Publishing Division of International Aeradio Ltd has opened its new Western Europe Agency in Frankfurt am Main. The address is Grimex GmbH, Frankfurt am Main, Elbestrasse 29/II, Germany, and the general manager is Mr Bogomir Gradisnik, who is stated to be "fully aware of the operational needs of airlines, charter companies and private aviators." The agency will handle sales and enquiries for the Aerad Flight Guide in continental Europe.

Hovercraft Fan Drives

FROM the makers of Miraclo and Meteor transmission belts comes news that their products are performing important duties in the Vickers-Armstrongs VA-1 research hovercraft (described in *Flight* last week).

A standard endless Type S20 Meteor belt 8$\frac{1}{2}$in wide drives the lift-fan shaft, transmitting over 120 h.p. from the Gipsy Major main engine at 2,100 r.p.m.; and the engine cooling fan is driven at 6,500 r.p.m. by a 1in-wide Type MT Miraclo belt, transmitting 3 h.p. Both belts are of the flat, nylon-core variety made by the company—Stephens Belting Co Ltd, of Snow Hill, Birmingham 4.

In Brief

AVM G. P. Chamberlain, CB, OBE, who retired from the RAF last September after 37 years' service, has been appointed managing director of Collins Radio Co of England Ltd.

The Plessey Co Ltd announces the appointment of Mr R. L. Higgin, AMIEE, as general manager, components group. He was formerly commercial executive of this division.

Playcraft "Vapour Trail" miniature scale-model aircraft—subject of a note in *Flight* last week—are to undergo a production change. In place of the Sea Vixen and Canberra originally announced there will be models of the Scimitar and Hunter.

Racal Engineering, of Western Road, Bracknell, Berks, have changed their name to Racal Electronics Ltd. The original company was formed in 1951—its name is compounded from those of its founders, RAymond Brown and CALder Cunningham—and has since attained worldwide recognition in the electronics field.

Willesden and Hendon Productivity Association is to hold a conference on *Production Control as a Means to Higher Productivity*, to take place at the FBI headquarters in Westminster on November 22. The conference fee is 3gns, and requests for reservations should be made to Mr D. I. Duncan, AEI Switchgear Division, 20 Neasden Lane, London NW10.

Mr Alexander Johnston, until recently head of the SBAC's information department, has been appointed public relations manager of Bristol Siddeley Engineers Ltd, in London. In Coventry, Mr Selwyn Sharp, public relations officer of the company's Power Division, will now devote his whole time to this side of the business; and Mr R. H. Butcher will continue as press officer of the Aero Engine Division at Bristol.

The appointment of Mr Arthur Ruston as director for production for the Goodyear Tyre & Rubber Co (Gt Britain) Ltd was announced recently. Formerly plant manager at Goodyear-Luxembourg, he has succeeded Mr John Q. Shaul on the latter's return to the USA for re-assignment. In his new post, Mr Ruston is responsible for overall production at the two Goodyear factories at Wolverhampton and Glasgow.

A reference to Dowty Equipment Ltd in our review last week of electronics products should have read, correctly, "Dowty Electrics Ltd."

ADMIRAL'S INSPECTION: Rear Admiral E. Mill, RN, sees for himself the excellent condition of the Napier Gazelle engine that powered the Wessex which recently completed tropical trials in Libya. With him are Sir Archibald Hope, sales director, Napier Aero Engines (left); Mr D. P. Ferguson, assistant chief engineer (centre); and Mr W. E. Hampton, sales manager (right)

SERVICE AVIATION

Air Force, Naval and Army Flying News

First Anglo-German aerobatic team, equipped with French Fouga Magisters, this formation is based at Landsberg in Bavaria where jet pilots of the West German Air Force are trained. CO of the RAF mission at Landsberg is Wg Cdr D. Chopping

Australians in US

SEVENTY-TWO members of the Royal Australian Air Force—40 officers and 32 other ranks—arrived in San Diego, Cal, recently to familiarize themselves with the latest version of the Lockheed P2V-7. Twelve of these aircraft are to be delivered next year to their squadron, No 10, based at Townsville. Commanded by Wg Cdr C. A. Greenwood, this was the first Commonwealth squadron to operate against the enemy in the Second World War.

Sqn Ldr Brian Mercer, leader of the "Blue Diamonds," being congratulated by the West German Defence Minister, Herr Strauss, after the squadron's recent display at Furstenfeldbruck

More RCAF Vertol 107s

FOUR additional Boeing Vertol 107 twin-turbine helicopters have been ordered for the Royal Canadian Air Force, bringing to six the total number to be produced for the RCAF. Designated CH-113S, the aircraft are to be used for rescue work and general duties. Being purchased from the Vertol Division of Boeing of Canada Ltd, Arnprior, Ont, they will be built at the Boeing plant in Morton, Pa, with final acceptance by the RCAF at Arnprior.

They are described as "highly specialized search and rescue vehicles with exceptional load-carrying abilities," and will be able to carry a 2,000lb payload more that 650 statute miles before refuelling. They will have seats for 26 fully-equipped troops and be able to accommodate 15 litter patients.

For cold air operations the CH-113S are to have rotor blade de-icing and will be equipped with a portable auxiliary power unit for stand-by electrical power in extreme cold. Delivery of the first aircraft is scheduled for next year.

Busmen's Holiday

INSTRUCTORS of Oxford University Air Squadron have recently been giving practical map-reading instruction to senior police and fire officers as part of civil defence training. Similar courses have been given by 11 other university air squadrons.

Trainees who attended Oxford UAS on a five-day course were from South of England police and fire establishments coming under Reading CD headquarters. They were flown in Chipmunks and during their flight reported back by radio to a small operations room on simulated destruction, pin-pointing damage. The CO of Oxford UAS, Wg Cdr R. F. Harding, commented: "We find the police and fire training which these officers receive is of great help to them on the course. They take to map-reading readily and are good students."

Other university squadrons similarly engaged during the long vacation were Durham, Leeds, Nottingham, Cambridge, Southampton, Bristol, Birmingham, Manchester, London, Edinburgh and Queens' (Belfast).

Air Trooping to Germany

FROM October 2 the eighteen-hour surface journey by land and sea to Germany, via Harwich to the Hook, became a thing of the past for Servicemen and their families. From that date they were being flown by 67-seat Viscounts of BUA on charter to the Air Ministry on behalf of the three Services (see Air Commerce last week, page 568).

Terminals at the UK end are Gatwick and Manchester and at the German end Gutersloh, Dusseldorf and Hanover. During January, Wildenrath is also being used. There are 31 basic flights per month to Germany with provision for a further 21 depending on the need.

On October 3 a new air trooping centre at Gutersloh (to which brief reference was made on this page last week) was officially opened. It has a floor area of approximately 10,500 sq ft. The centre, for which the building was supplied by Terrapin Ltd in the form of 53 building Pack Units, was completed in 32 working days. The units were erected, and partitions, plumbing and air installation completed by men of the RAF Airfield Construction Branch.

IN BRIEF

AVM F. E. Rosier, the new C-in-C Middle East Air Force, had talks in Salisbury, Southern Rhodesia, last week with the Federal Prime Minister, Sir Roy Welensky, and Rhodesian Defence Staff representatives.

Mr Ken Hayes of Leicester, formerly an NCO with 60 Sqn, was flown out to Tengah, Singapore, recently to present the squadron with its original crest, which he saved during the Japanese invasion of Burma.

Financial assistance given by the RAF Benevolent Fund during the first half of this year amounted to £262,301, an increase of over £6,000 on the corresponding period of 1960.

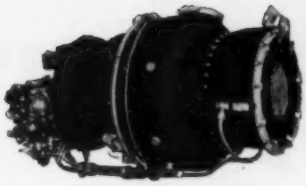
A history of 9 Sqn is being written by Flt Lt T. Mason, who was responsible for *Leads the Field*, the 12 Sqn history. Any readers who have information, photographs, etc, of 9 Sqn, which was formed in 1914 and successively flew Farmans, BE2Cs, Vimys, Virginias, Heyfords, Wellingtons, Lancasters, Lincolns and Canberras, are asked to communicate with Flt Lt Mason at the Officers' Mess, RAF Finningley, near Doncaster, Yorks.

An Alouette which brought the Colonel Commandant of the Honourable Artillery Company to Thetford, Norfolk, to inspect its infantry battalion during a recent TA camp. Pilot was Maj A. B. J. Forman of the Army Air Corps

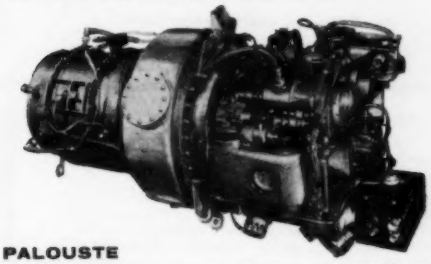
Blackburn
(LICENSEES FOR TURBOMECA ENGINES)

is the
only British company
which has
specifically developed
a range of
small gas-turbines
to meet
the requirements
of modern aviation

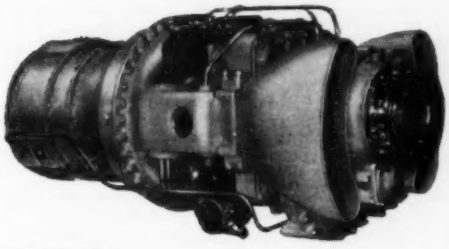
BLACKBURN ENGINES LIMITED
43 Berkeley Square, London W.1
Member Company of the Hawker Siddeley Group



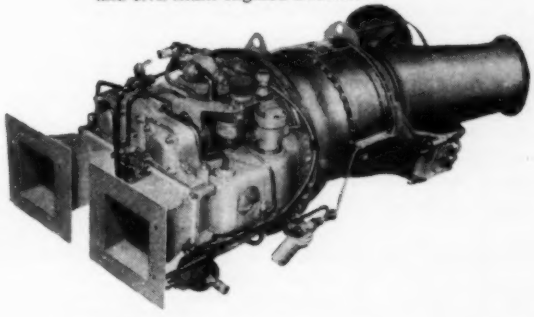
CUMULUS
The latest development in airborne units giving reduced size and weight and designed to meet all the most stringent air starting demands.



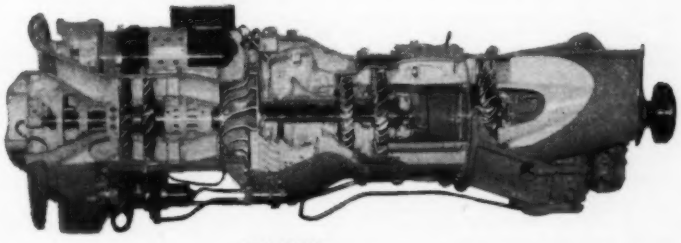
PALOUSTE
The standard low-pressure-air starter for the Royal Navy, Royal Air Force and aircraft manufacturers, etc.



ARTOUSTE
In quantity production as an A.A.P.P. for military and civil multi-engined aircraft.



TURMO
In production for helicopters, hovercraft and Royal Navy marine craft.



NIMBUS
A free-turbine engine in the 1,000-1,100 h.p. class specifically developed for helicopters and hovercraft.

E.179

FLIGHT

PRESS DAY — *Classified advertisement "copy" should reach Head Office by* FIRST POST THURSDAY *for publication in the following week's issue subject to space being available.*

CLASSIFIED ADVERTISEMENTS

Advertisement Rates. 1/2 per word, minimum 14/-. Special rates for Auctions, Contracts, Patents, Legal and Official Notices, Public Announcements, Public Appointments, Tenders 1/4 per word, minimum 16/-. Each Paragraph is charged separately, name and address must be counted. All advertisements must be strictly prepaid and should be addressed to FLIGHT Classified Advertisements Dept., Dorset House, Stamford Street, London, S.E.1.

Postal Orders and cheques sent in payment for advertisements should be made payable to "Flight," and crossed & Co.

Trade Advertisers who use these columns regularly are allowed a discount of 5% for 13, 10% for 26 and 15% for 52 consecutive insertion orders. Full particulars will be sent on application.

Box Numbers. For the convenience of private advertisers, Box Number facilities are available at an additional charge for 2 words plus 1/- extra to defray the cost of registration and postage, which must be added to the advertisement charge. Replies should be addressed to "Box 0000, c/o Flight," Dorset House, Stamford Street, London, S.E.1.

The Publishers retain the right to refuse or withdraw advertisements at their discretion and do not accept liability for delay in publication or for clerical or printer's errors although every care is taken to avoid mistakes.

AIRCRAFT FOR SALE

R. K. DUNDAS AERO LTD.
DON'T LET THE GADGETS BEAT YOU

MOST OF THE NEW AIRCRAFT coming on the market here in the United Kingdom and on the Continent are equipped for all weather operation, all the year round.

BUT THERE IS little point in having all the "black boxes" if you cannot get the best possible use out of them, and here we can help you by providing the full range of Jeppesen Airway Manuals and navigation equipment. World coverage is available in the Airway Manuals, giving all the en-route navigational and airport facilities you require in planning and executing any trip. The Jeppesen products are as useful to the private pilot as they are to the professional.

THE ACCESSORIES available include three different types of Flight Cases, ten different types of computers, five different plotters/protractors, and a useful range of briefing booklets.

FOR ALL Jeppesen products and for all types of aircraft, from Tiger Moths to Comets, contact:

R. K. DUNDAS AERO LTD.
DUNDAS HOUSE
59 ST JAMES'S STREET,
LONDON, S.W.1.

Tel.: HYDe Park 3717. Cables: DUNDUK [0559

D. H. CHIPMUNK Mk 22, full dual, 10 channel radio, night flying, electric starter. Zero hours since complete overhaul. Full Aerobatics C. of A., etc. £3,000.

WHITTEMORE'S OF BIGGIN HILL, Kent, Biggin Hill 2211. [0501

PROCTOR MK 1, 4 seats, dual V.H.F., C. of A. June 1962. 330 hours on engine. £300. Box No. 7546. [2475

OFFERS REQUIRED. Two Ansons with Cheetah 19 engines inhibited full equipment. One current C. of A. As spares price accepted. Box No. 7548.

TIGER MOTH. C. of A. valid until 1963. Good condition. Bargain £300. 227 Hagley Road, Birmingham 16. [2482

PROCTOR III. Four seats, fast, robust, low hours. Full details from Vendair Ltd., Biggin Hill Airport, Kent. Tel. BN9 2251. [0139

AIRCRAFT ACCESSORIES & ENGINES

ROLLASON'S for Tiger Moth spares. Gipsy engine overhauls and spares; and now increased facilities at Biggin Hill for your C. of A. overhaul. All light aircraft types acceptable. Croydon 5151. [0133

AIRTRADE LTD. for Aircraft and Aero Engine spares. Components and Instruments. A.R.B., 3 Croydon Airport, Surrey. Tel.: CRO 0643. [0232

FAIRCHILD Argus engines and airframe complete. Travelair Ltd., 115 Oxford Street, W.1. (Tel.: GER 3382.) [0135

PLUGS and Sockets. More than 1,000,000 in stock covering over 50 different ranges. British and American. Stock list on application to Sasco, Nutfield, Redhill, Surrey. Tel.: Redhill 5050. [0052

AERONAUTICAL & MARINE SUPPLIES LTD. for all aircraft and engine spares for Dakota, Viking and Dove aircraft. Aeronautical and Marine Supplies Ltd., Southend Airport, Essex. Tel.: Southend 40334/6/. [0163

H. T. NEWTON AND CO. and NEWTONAIR LIMITED, Gatwick Airport, for all your aircraft electrical and electronic equipment. A.I.D. and A.R.B. [0299

INVESTORS. 400cys, etc. Types 8A; 100A; 100B; 200; supplied "as is" or released to A.R.B.

FUEL PUMPS, brand new. Type SPE 400 Mk 1 (5UE6200) 24 volt. 400 GPH/PSI 10 SPE. & Co. Ltd., Type PUL201 Mk 2 (5UE6237) Part No. 07949.

K. E. JORDAN LTD., 87 Lord Street, Liverpool. [2439

30 EUROPE'S LEADING AIRCRAFT TRADERS
YEARS EXPERIENCE AND SERVICE

Do you know that:

Shackleton's have the finest selection of new and used aircraft available for sale in this country?

Shackleton's can supply any make of new aeroplane at standard list price and will take your existing aircraft or car or both in part exchange?

Shackleton's can offer attractive terms for extended credit from the smallest single seater to the multi jet transport?

Shackleton's will include the most competitive rates for insurance with every aircraft sold?

It will be our pleasure to be of service to you

SHACKLETON AVIATION LIMITED
HYDE PARK 2448/9 175 PICCADILLY, LONDON, W.1

AIRCRAFT ACCESSORIES & ENGINES WANTED

WANTED, GIPSY QUEEN II engine for Proctor. Please send details of price and hours remaining, to 7 Earlsdon Street, Coventry, or telephone Coventry 74979. [2485

AIR PHOTOGRAPHY

A. W. YOUNG. Specialists in all ex-Government photographic equipment. Showrooms at 156 Chatsworth Road, London, E.5. Tel.: AMHerst 6528. [0298

BUSINESS OFFERS

TWO VACANCIES exist for P.P.L. holders to take one-sixth share each in private light aircraft. Write now Box No. 7462. [0421

CLOTHING, FOR SALE OR WANTED

R.A.F. officer's uniforms purchased, good selection of R.A.F. officers' kit for sale, new and reconditioned. Fisher's Service Outfitters, 86-88 Wellington Street, Woolwich. Tel.: Woolwich 1055. [0567

ELECTRICAL EQUIPMENT

ELECTRICAL Connectors. More than 1,000,000 in stock, covering over 50 different ranges. British and American. Stock list on application to Sasco, Nutfield, Redhill, Surrey. Tel.: Redhill 5050. [0054

ENGINE OVERHAULS

ENGINE overhauls. Hants & Sussex Aviation Ltd. offer Britain's most comprehensive overhaul service, including magneto and component overhaul with spares supply. All D.H. range up to Queen 30 Mk. 2 for Heron. Armstrong Siddeley, Blackburn Cirrus, Lycoming and United Kingdom distributors of Continental motors. Huge exchange pool most type engines. Specialists in export work. Address: The Airport, Portsmouth, Hants. Tel.: 63051. [0711

BRITISH
WIRE THREAD INSERTS
Precision made in Carbon Steel for Aluminium and Magnesium. Also in Stainless Steel and Bronze.
B.S.F. · Metric · B.S.P. · B.A.
Whitworth · Unified
CROSS MANUFACTURING CO. (1938) LTD
COMBE DOWN · BATH · SOMERSET
COMBE DOWN 3155 · Grams: CIRCLE, BATH

Cessna
APPOINTED DEALERS
The North & West Midlands: Westair Limited, Squires Gate Airport, Blackpool, Lancs.
East Anglia & East Midlands: W. H. & J. Rogers (Engineers) Ltd., Gt. Barford, Bedford.
West: Steels (Aviation) Limited, Clifton, Bristol.
Scotland: Airwork Services Limited, Perth Aerodrome, Perth, Scotland.
SOLE DISTRIBUTORS IN GREAT BRITAIN ARE
AIRWORK SERVICES
PANSHANGER AERODROME · HERTFORD
TELEPHONE: ESSENDON 315

PRATT & WHITNEY ENGINES

1830-90D.	Nil hours, Certified A.R.B.	£1,000
985-AN-1	No History	£395
1340-AN-1	Nil hours	£450
1340-AN-1	Time expired	£175

Also largest stock of spares in Europe for 985/1340/1830/2000/2800.
STARAVIA LTD.
Redfields Works, Church Crookham, Nr. Aldershot, Hants.
Tel.: FLEET 1383

AIRMOTIVE SUPPLY (LONDON) LTD.
Affiliate of Airmotive Supply Corpn. (U.S.A.)
SUPPLIERS OF PRATT & WHITNEY ENGINES AND ENGINE PARTS AND RELATED SPARES TO WORLD AVIATION
28 VICTORIA STREET, LONDON, S.W.1
Telephone: ABBey 7788

There is a **JODEL** *for you.*
Either the **AMBASSADEUR** 3 seater or the **MUSKETEER** 4—5 seater.
U.K. Agents:
ROLLASON AIRCRAFT & ENGINES LTD.
REDHILL AIRPORT · · · SURREY
Telephone: NUTFIELD RIDGE 2212

FOR CHARTER

AIR LINKS have a DC3 fleet available for charter, up to 36 seats or freight from Gatwick or Leeds Airport. Enquiries to Air Links, Gatwick Airport. (Tel. No.: Livingstone 8811, ext. 6543.) [0236

GROUND EQUIPMENT

SURPLUS TEST EQUIPMENT for sale. Hydraulic, pneumatic, vacuum, electrical, low temperature, instrument, propeller, tensile impact, creep, crack detection, etc. Send requirements. L. Sollonan Ltd., 1 Beaufort Street, Manchester, 3. Phone BLAckfriars 4571. [0452

INSURANCE

FULL FLYING COVER INCLUDED for Life, Endowment Assurances, House Purchase and Retirement Provision WITHOUT ANY EXTRA PREMIUMS for Pilots and Aircrew of Civil Airlines and Flying Clubs. Competitive terms for R.A.F. Personnel, Instructors, Test Pilots. City Assurance Consultants Ltd., 46 Cannon Street, London, E.C.4. CITy 2651/2/3. [0068

PACKING AND SHIPPING

R. & J. PARK LTD., Dominion Works, Thames Road, Chiswick, London, W.4. Phone: Chiswick 7761. Official packers and shippers to the aircraft industry. [0012

PARACHUTES

FREE FALL and emergency life saving parachute assemblies (mains and reserve) for sale. Apply: Jeremy Johnston, St. Thomas's House, Lambeth Palace Road, London, S.E.1. Tel.: Waterloo 4625. [2484

PUBLIC APPOINTMENTS

AIR MINISTRY have vacancies for CIVILIAN RADIO TECHNICIANS at RAF Sealand, Cheshire; REU Henlow, Bedfordshire; and various other RAF stations throughout the United Kingdom, for the servicing, repair, modification and testing of air and ground radio and radar equipment. Commencing salary (National) (according to age) is £630 to £810 p.a. max. salary £930 p.a. Rates are subject to small deduction at certain provincial stations. Houses may be available for renting at West Kirby some 15 miles from Sealand. Apply to Air Ministry, C.E.3h. Princes House, Kingsway, London, W.C.2, or to any Employment Exchange quoting City O/N 3057 [0560

RADIO AND RADAR

AFTER SALES SERVICE. We guarantee 12 months free servicing on all new equipment sold by us. Make sure you order your new and secondhand equipment from A. J. Whittemore (Aeradio) Ltd., Biggin Hill, Kent. [0302

SERVICES OFFERED

REPAIRS and C. of A. overhauls for all types of aircraft. Brooklands Aviation Ltd., Civil Repair Services. Sywell Aerodrome, Northampton. Tel.: Moulton 3251. [0307

SITUATIONS VACANT

UNLICENSED AIRCRAFT ELECTRICIAN required for service in the Persian Gulf area. Good leave and allowances. Apply The General Manager, Airwork Services Ltd., Bournemouth (Hurn) Airport, Christchurch, Hants. [2463

SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS. A vacancy exists for a Technical Officer to assist in the Secretaryship and management of a range of Technical Committees with special reference to those serving metallic materials and production processes. Some familiarity with report writing or similar experience is desirable. Write, giving particulars, to the Technical Secretary, The Society of British Aircraft Constructors Ltd., 29 King Street, St. James's, London, S.W.1. [0237

NOW!
The magic "MORAVA" L200A

The latest Aircraft from
OMNIPOL of Czechoslovakia

The Morava is the most luxurious, reasonably priced and comprehensively equipped Executive aircraft in its class.
Spacious 5 seater with ample luggage space.
Economical cruising at 174 m.p.h. for a total consumption of only 11 g.p.h.
Full airframe and propeller de-icing included as standard.
Two 210 H.P. Walter M337 engines with Fuel Injection.
Variable Pitch, fully feathering Propellers.
Hydraulically operated flaps and tricycle undercarriage.
British C of A Validation in full Public Transport Category (Group C).
Full Spares Backing
Enquiries welcomed also for the Aero 145 twin and the elegant single engine Meta-Sokol

SOLE U.K. AGENTS
PETER S. CLIFFORD & Co. Ltd.
Oxford Airport, Kidlington
Phone Kidlington 3355
Evening and W/Ends Bletchington 392
in conjunction with G/C Edward Mole, U.K. Distributor.
World wide distributors OMNIPOL, PRAGUE

Don Everall
(AVIATION) Limited

offer for sale 1 Auster V.J.1.N. and 1 Auster V.J.1. at competitive prices. We also have several other aircraft available for sale, including Tiger Moth, Piper Caribbean, Miles Messenger.

Suppliers of new and secondhand aircraft. Spares of all descriptions. Specialists in C. of A. overhaul and general maintenance.

Full particulars and prices of all aircraft can be obtained from:

SALES AND SERVICE DEPARTMENT
DON EVERALL
(Aviation) Limited
WOLVERHAMPTON AIRPORT
TELEPHONE: FORDHOUSES 2191

THE EVEREST
¾-length coat

A full ¾-length coat, 34", really warm and comfortable. In lovat shade proofed gaberdine, lined right through the body with soft sheepskin, with a collar of beaver lamb. Waterproof interlined throughout.
Sizes 34 to 44 chest, length 34" Price **£7/7/-**

★**Gosport tubes.** Cat. 213—for R.A.F. type helmets, **22/6.**
★**R.A.F. Type Sheepskin lined Flying Jackets, £11/17/6.**
★**Goggles,** flying, mk. 8, **25/-**
★**Spectacles,** Mk II anti-glare, c/w case, **30/-.**
★**Overalls,** flying, fully zipped, white or black, **84/-.**
★**Masks, oxygen,** c/w mic., brand new, **39/6.**
★**Gloves,** flying cape, **18/6.** *Terms to Flying Clubs. Illustrated leaflet on request. Trade supplied.*

NEW SHOWROOM NOW OPEN FOR FLYING AND MOTOR RACING CLOTHING.

D Lewis **(Dept. F), 124 Great Portland Street, London, W.1.**
Tel.: MUSeum 4314. Grams: Aviaki, Wesdo, London.

TRADAIR LIMITED
at Southend Airport

URGENTLY REQUIRE SKILLED
AIRCRAFT ELECTRICIANS

Experience on Viscount and/or Viking aircraft an advantage.

Top salaries will be paid, and every consideration will be shown.

Please apply in detail to:
Chief Electrical Engineer
Tradair Limited, Southend Airport
Southend-on-Sea, Essex

SITUATIONS VACANT

ADEN AIRWAYS (BOAC ASSOCIATE). Due to continued expansion with the impending introduction of the Avro 748 Aden Airways are seeking additional Licensed Aircraft Engineers. Essential qualifications are sound practical experience. "A" Licence on DC3, Argonaut and/or "C" License on P. & W. 1830 and R.R. Merlins. Turbine experience or licences a considered advantage. Salaries in the range £1,548 to £1,938 p.a. dependent upon qualifications and experience, with income tax paid, free furnished accommodation for both married and single engineers. 60 days U.K. leave per annum, free passages for successful applicant and his family, together with generous contributory Pension/Provident and Medical Schemes. Engineers interested in an interview are asked to forward full details of qualifications and experience in strict confidence to Personnel Manager, BOAC Associated Companies Ltd., Airways Terminal, Buckingham Palace Road, London, S.W.1. [2468

B.O.A.C. ASSOCIATED COMPANIES LIMITED, Kuwait Airways Limited, Kuwait, urgently require on a temporary or a permanent appointment a Twin Pioneer Captain to operate in connection with their oil company charters. Minimum Licence requirement for this appointment is a senior commercial licence with a valid instrument rating and appropriate type technical for the Twin Pioneer. The rates of pay in the range: Married £2,639 per annum to £2,737 per annum and Single £2,414 per annum to £2,512 per annum with free accommodation and all income tax paid. Two months annual leave or pro rata for temporary. Apply in writing or telephone P.M. B.O.A.C. (A.C.) Airways Terminal, Buckingham Palace Road, London, S.W.1. Tel.: Victoria 2323, ext. 2. [2464

AIRLINE STATION MANAGER. Skyways Coach Air Limited require a Station Manager for their Victoria Terminal. Good working knowledge of Airline Reservation Systems and Traffic Administration essential. Salary commensurate with qualifications and experience. Applications to Personnel Officer, Skyways Limited, 7 Berkeley Street, London, W.1. [2477

A. & C. LICENSED ENGINEERS, endorsed DC-6; O Licensed Engineers, preferably DC-6 required for operation based at Beirut. Apply Group Captain Mole, Piccadilly House, Piccadilly Circus, London, S.W.1. [2487

AGENTS REQUIRED in several European countries to sell recently introduced American twin aircraft. Attractive areas and terms now available. Details your organization to: Box 7556. [2486

SITUATIONS VACANT

VACANCY FOR FAA certificated mechanic. Constellation experience desirable. Good salary for right man. Prospects excellent. Box No. 7547. [2476

CIVILIAN TECHNICAL INSTRUCTORS, Naval Helicopter School, Culdrose, Helston, Cornwall. Five posts for men to instruct student pilots in (a) Aircraft and Ship Recognition and Signals; (b) Engineering on Helicopter engines and airframes; (c) Helicopter Electrics and Electronics. One instructor will also be required to lecture in general naval subjects and assist in the administration of the School. Instructional experience essential, and O.N.C., C, and G, Certificate or equivalent desirable. Selection by trade test and interview. Starting salary £868 (at 26) to £993 (at 30 or over) rising to £1,071. Write for application form to Commanding Officer, R.N. Air Station, Culdrose, Helston, Cornwall. Closing date October 26th, 1961. [2478

AIRWORK INTERNATIONAL LTD. (a British United Airways Company) invite applications from aircraft engineers licensed for Dove/Twin Pioneer for service in the Middle East. Salary commencing at £1,175 p.a., plus allowances of £1,296 p.a. for bachelors or married men not accompanied by their families, or £1,560 p.a. for married men accompanied by their families. Contract period two years with an option to renew, 48 days annual leave with free passages by air.

THERE WILL ALSO be a requirement for a temporary engineer for Beaver operations in West Africa for a period of three or four months as from March 1962; salary and allowances in the range £2,150-£2,250 p.a. dependent on qualifications, free accommodation. Applications in writing should be addressed to Airwork International Ltd., Redhill Aerodrome, Surrey. [2479

CHIEF FLYING INSTRUCTOR and Assistant Instructor required. Permanent positions. Full details of experience, licences and ratings, etc., to Bristol & Wessex Aeroplane Club Ltd., Bristol (Lulsgate) Airport, Bristol. [2480

GROUND ENGINEER REQUIRED. A. & C. Licences. Permanent position. Apply: Bristol & Wessex Aeroplane Club Ltd., Bristol (Lulsgate) Airport, Bristol. [2481

FITTER REQUIRED for light aircraft duties. Holder of "A" or "C" Licence preferred, but not essential. Write, please, to the London School of Flying Ltd., Elstree Aerodrome, Herts. [2488

TUITION

SURREY & KENT FLYING CLUB, Biggin Hill (BN9) 225. M. of A. approved course. Tiger and Hornet Moths, Chipmunk and Prentice. Contract rates. Route 705, one hour from Victoria. [0293

SOUTHEND-ON-SEA MUNICIPAL FLYING SCHOOL, Commercial and Private Pilot's training Instructors' Courses, night flying every night. Rates from £4 (contract). No entrance fee or subscription. Municipal Airport, Southend-on-Sea. Southend-on-Sea 40201. [0450

LONDON SCHOOL OF AIR NAVIGATION offers full-time personal coaching with Home Study Correspondence Courses or combination of both for all aspects of professional pilot and navigation certifications, also PPL. Officially appointed Services Courses Scheme, 33 Ovington Square, Knightsbridge, London, S.W.3. KEN 8221. [0510

LEARN TO FLY, £37; Instructor's Licence and Instrument flying for £4 12s. 6d. Night flying £5 12s. 6d. per hour. Residents 6 guineas weekly. Specialised Courses for Commercial Pilot's Licence. Wiltshire School of Flying Ltd., Thruxton Aerodrome (Andover Junction, 1hr 15 min from Waterloo), Hants. [0253

A.F.R.Ae.S., A.R.B., Certs., A.M.I.Mech.E., etc. on "No Pass—No Fee" terms. Over 9000 successes. For details of Exams and Courses in all Branches of Aeronautical work, Aero Engines, Mechanical Eng., etc. Write for 148-page Handbook—free B.I.E.T. (Dept. 702), 29 Wright's Lane, London, W.8. [0707

DENHAM LINK TRAINING CENTRE, D4 and ANT 18 Trainers, Instrument Ratings, Renewals and latest procedures for flights to any Aerodrome in the World. 21s. an hour. Denham 3171. [0295

Perfect Precision Aircraft Spring Washers to B.S. Spec. 2 SP. 47

CROSS MANUFACTURING CO. (1938) LTD.
Combe Down · Bath · Som.
Tel: Combe Down 2355/8
Grams: Circle, Bath

17 to 25 . . . with G.C.E.?
FLY AS AN OFFICER IN THE R.A.F.

A fighter pilot on reconnaissance over the Red Sea; a navigator plotting his Comet's course from Wiltshire to Australia; an air electronics officer in a 'V' bomber operating complex electronic equipment; . . . these men have chosen an exciting, absorbing and rewarding career. They are aircrew officers in the Royal Air Force.

Have you got what it takes to join them?
To apply for a Direct Entry commission you must be under 26, fit, and hold or expect to gain G.C.E. at 'O' level (or equivalent) in five acceptable subjects including English language and mathematics.

With these qualifications behind you, you can begin *now* a career that can take you all over the world. Pay is excellent—you will earn £950 a year at 21 as a Flying Officer, and you can earn over £1750 at 25 as a Flight Lieutenant on full allowances.

Length of Service
You are guaranteed service to age 38 (or for 16 years, whichever is longer) qualifying you for a pension of at least £455 a year as well as a tax-free gratuity of at least £1365; there are good opportunities to serve until you are 55 with increased pension and gratuity. Alternatively you may serve for 8 or 12 years. A few commissions allow you to leave after 5 years. These periods of service entitle you to a generous tax-free gratuity—from £775 after 5 years to £4000 after 12 years.

Act Now!
If you would like to know more about careers in the R.A.F., write, giving your date of birth and details of education, to **Group Captain J. A. Crockett, R.A.F., Air Ministry (FR 854), Adastral House, London, W.C.1.**

THE FUTURE IS WITH THE R.A.F.

TUITION

EXETER SCHOOL OF FLYING offers the least expensive and most comprehensive flying training available. We specialise in Commercial Pilot training and Instructors' training and our Private Pilot's course is approved. Contract rates from £3 18s. 6d. Full Air Traffic Control. VHF/DF and 24 hour Met Service. Radio equipped aircraft. Grass or runways. Local accommodation from £3 10s. Airport £5 15s. 6d. Exeter Airport Limited, Exeter. Tel.: 67433. [0281

VENDAIR FLYING CLUB. Flying training, Tigers, Austers, etc. Full details on request. Write or phone Biggin Hill 2251. [0239

AVIGATION LTD. provides full-time or postal tuition or a combination of these methods for M.O.A. pilot-navigator licences. Classroom instruction can be provided for A.R.B. General and Performance Schedule examinations. D4 Links: Ring RODney 8671. For details apply Avigation Ltd., 30 Central Chambers, Ealing Broadway, London, W.5. EALing 8949. [0248

BOOKS

"KNOW Your Car." 5th Edition. A simple explanation of its mechanism. By the staff of "The Autocar." A clear and straightforward explanation of the working principles of the modern car. Profusely illustrated with easy-to-understand drawings, it gives the novice driver all the basic information about his vehicle that is needed. 3s. 6d. net from all booksellers. By post 4s. from Iliffe Books Ltd., Dorset House, Stamford Street, London, S.E.1.

"RALLIES and Trials," by S. C. H. Davis of "The Autocar." Describes in a colourful style the author's many adventures whilst driving in rallies and trials in all parts of Britain and Europe. The Monte-Carlo Rally, the exciting Alpine Trials and many other spectacular events are recalled by this world-renowned racing driver. 15s. net from all booksellers. By post 16s. from Iliffe Books Ltd., Dorset House, Stamford Street, London, S.E.1.

"MATERIAL Handling in Works Stores," 2nd Ed., by J. Hoefkens. Shows how the use of fork-lift trucks and pallets in industrial stores can increase production, utilize floor space more effectively, help control of movement and reduce costs. Includes a description of a system actually operated in a modern factory. 18s. net from all booksellers. By post 19s. from Iliffe Books Ltd., Dorset House, Stamford Street, London, S.E.1.

"YACHTING Quizzes," by Max A. Chappell. Packed with information on everything nautical, from tides to trade winds, from fishing grounds to first aid. A book every enthusiast must read. 3s. 6d. net from all booksellers. By post 4s. from Iliffe Books Ltd., Dorset House, Stamford Street, London, S.E.1.

"ABACS or Nomograms," by A. Giet. Translated from the French by H. D. Phippen and J. W. Head. Most engineers have made use of nomograms at some time in their careers, and are fully alive to the fact that they are a convenient tool when the same formulae have to be solved repeatedly for several sets of variables. It is fair to say, however, that only a small proportion of even those who habitually employ nomograms know how to construct them for their own use. Most of the comparatively small literature on the subject is written for mathematicians and is extremely difficult for the practical engineer to comprehend. This book is essentially practical, and not only demonstrates the many and varied applications of the abac or nomogram, but shows how even those without highly specialized mathematical knowledge may construct their own charts. 35s. net from all booksellers. By post 36s. from Iliffe Books Ltd., Dorset House, Stamford Street London, S.E.1.

"THE Autocar Road Tests—Autumn 1959." By "The Autocar" technical staff. Illustrated reports on the performance of current British and foreign cars including small family cars, luxury saloons and enthusiasts' sporting models. Each report contains a description of the car's behaviour under varying conditions, numerous photographs and plans and a comprehensive table of technical information. 6s. 6d. net from all booksellers. By post 7s. 2d. from Iliffe Books Ltd., Dorset House, Stamford Street, London, S.E.1.

FLY at FAIR OAKS!

UNIVERSAL FLYING SERVICE LTD.

offers complete flying training courses for the Private Pilot's Licence. Fleet includes Piper Colts, Tri-Pacer, Austers and Tiger Moths.

Engineering department provides full facilities for Assembly and Validation, Maintenance, Repairs, C. of A. renewals and Radio Servicing.

Club House and licensed bar.

FAIR OAKS AERODROME

CHOBHAM, SURREY

Telephone: Chobham 375

only half an hour from London

Don Everall

(AVIATION) Limited

can now offer for sale the BEAGLE A.109 AIREDALE, full details of specification given and demonstration arranged on application to

Sales and Service Department

DON EVERALL (AVIATION) LIMITED

WOLVERHAMPTON AIRPORT

Telephone: Fordhouses 2191

MINISTRY OF AVIATION

Air Traffic Control Officers

Posts for men or women at least 23 and under 35 on 1/7/61. Candidates must have had recent aircrew experience, preferably as pilot or navigator in civil air transport or H.M. Forces; but exceptionally, extensive experience in A.T.C.O. duties may be accepted. They should normally also have G.C.E. with five passes, or an equivalent academic qualification. Starting salary (London) from £872 to £1,251. Maximum £1,599. Appointment initially unestablished, but prospects of establishment and promotion. Apply:

MINISTRY OF AVIATION
Est 5 (a) 1/R 758, The Adelphi,
John Adam Street, London, W.C.2.

ROYSTON INSTRUMENTS LTD.

MIDAS

Magnetic Tape Data Recording

SENIOR SALES AND SYSTEMS ENGINEER

is required for our Aircraft Division. Considerable knowledge of aircraft systems and associated transducers is required, and experience of aircraft flight recording problems is desirable.

Salary is dependent on experience and qualifications.

Please reply to:—

The Managing Director,
Royston Instruments Ltd,
Canada Road, Byfleet,
Surrey.

Tel. Byfleet 42211

ROLLS-ROYCE

LIGHT AIRCRAFT ENGINE DEPARTMENT

CREWE

Licensed Ground Engineer

required with current 'C' and/or 'D' Licences on Continental 4 and 6 cylinder engines. The Licence should preferably include the 0-470 and the 10-470 engines and preference will be given to applicants with actual working experience on these engines. Overhaul experience would be an added advantage.

Applications, giving full particulars of past and present experience, together with age and present salary, will be treated in strict confidence and should be addressed to the:-

PERSONNEL MANAGER · ROLLS-ROYCE LIMITED · CREWE

W. BRYAN Savage AMPLIFIERS

FOR CALIBRATION & STANDARDISATION OF INSTRUMENTS

In the Fleet Air Arm, modern techniques depend on the accuracy of instrumentation. Our photograph shows precise calibration of important electrical and electronic instruments being carried out at the calibration centre of the Fleet Air Arm. The requirement for a power source of High Stability is met by a Savage 1KW Amplifier Type KM2N.

A stable output amplifier allows calibration work to be carried out unaffected by random changes in the power supply or load; consequently greater accuracy is achieved.

The advantages of an amplifier compared with rotary equipment

FREQUENCY
easily variable and range 50-5,000 c/s

OUTPUT VOLTAGE STABILITY
better than 0·01% over periods of 1 minute

WAVE FORM
distortion less than 0·5%

COST
considerably cheaper; maintenance simple and less costly

The amplifier is silent in operation and takes up very little space

W. BRYAN SAVAGE LTD., 17 STRATTON ST., LONDON, W.1
Telephone: GROSVENOR 1926

Da 5121061F

CLASSIFIED ADVERTISEMENTS

Use this Form for your Sales and Wants

To "Flight" Classified Advertisement Department, Dorset House, Stamford Street, London, S.E.1. Waterloo 3333

PLEASE INSERT THE ADVERTISEMENT INDICATED ON FORM BELOW

- **RATE: 1/2 PER WORD, MINIMUM 14/-.**
- Name and address to be included in charge if used in advertisement.
- **BOX NUMBERS: If required, add 2 words plus 1/-.**
- **PRESS DAY: 1st POST THURSDAY, for following week's issue.** Cheques, etc., payable to "FLIGHT" and crossed "& Co."

NAME.....

ADDRESS .....

.....

					Please write in BLOCK LETTERS with ball pen or pencil.

REMITTANCE VALUE.....ENCLOSED NUMBER OF INSERTIONS REQUIRED.....

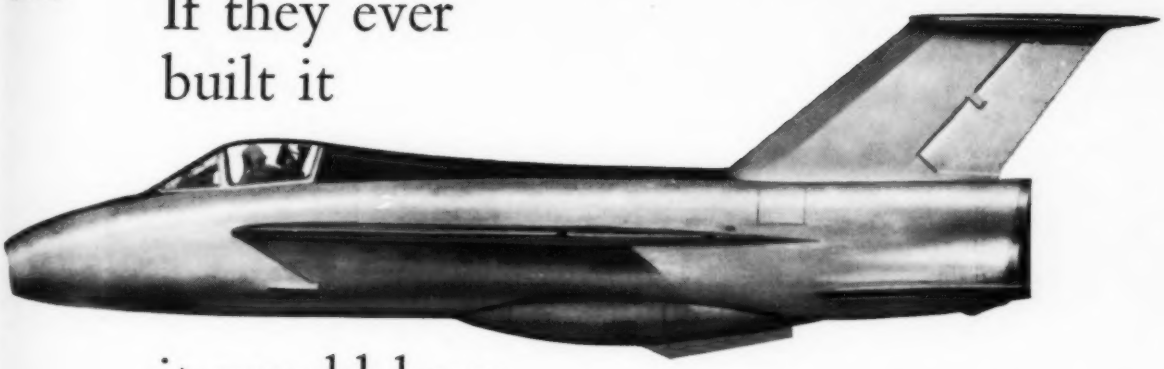
INDEX TO ADVERTISERS

	Page
Airmotive Supply Ltd.	11
Airwork Services Ltd.	11
"Autocar, The"	Cover iii
Automotive Products Ltd.	Cover iv
British Aircraft Corporation	6, 7
Cellon Ltd.	Cover i
Central Office of Information (R.A.F.)	12
Clifford & Co. Ltd., Peter S.	11
Cross Manufacturing Co. (1938) Ltd.	11, 12
Engel & Gibbs Ltd.	8
English Electric Aviation Ltd.	8
Everall Aviation Ltd., Don,	11, 13
Ferranti Ltd.	Cover ii
Goodyear Tyre & Rubber Co. (G.B.) Ltd.	4
Hawker Siddeley Aviation Ltd.	2, 5, 9
Honeywell Controls Ltd.	1
Iliffe Books Ltd.	14
Lewis Ltd., D.	12
Ministry of Aviation	13
Rollason Aircraft & Engines Ltd.	11
Rolls-Royce Ltd.	3, 13
Royston Instruments Ltd.	13
Savage Ltd., W. Bryan	14
Scottish Aviation Ltd.	9
Shackleton (Aviation) Ltd.	10
Staravia Ltd.	11
Teddington Aircraft Controls Ltd.	Cover iii
Tradair Ltd.	12
Universal Flying Services Ltd.	13

Printed in Great Britain for the Publishers ILIFFE TRANSPORT PUBLICATIONS LTD., Dorset House, Stamford Street, London, S.E.1, by THE GARDEN CITY PRESS LIMITED, Letchworth, Hertfordshire. Flight can be obtained abroad from the following: AUSTRALIA AND NEW ZEALAND: Gordon & Gotch Ltd. INDIA: A. H. Wheeler & Co. CANADA: The Wm. Dawson Subscription Service Ltd., Gordon & Gotch Ltd. SOUTH AFRICA: Central News Agency Ltd.; Wm. Dawson & Sons (S.A.) Ltd. UNITED STATES: Eastern News Co., 306 West 11th Street, New York 14.

TAC 223

If they ever built it



it would have TEDDINGTON CONTROLS

Looks revolutionary, doesn't it? Yet you may think some of its features are strangely familiar! We can safely tell you this—that familiar Teddington components would be very much in evidence if this aircraft ever got off the drawing board. Why? Because British aircraft of every type are invariably equipped with the controls that give outstanding reliability and performance—Teddington!

Teddington CONTROLS

REGD TRADE MARK

✻ The aircraft illustrated is made up of 3 different operational aircraft. Can you identify them? Check your answer below.

TEDDINGTON AIRCRAFT CONTROLS LIMITED

MERTHYR TYDFIL · SOUTH WALES · TELEPHONE: MERTHYR TYDFIL 3261

London Office: Colnbrook By-Pass, West Drayton, Middlesex. Telephone: Colnbrook 2202/3

WESTERN LIGHTNING JAVELIN

To prepare you for your 1962 motoring

LONDON SHOW NUMBERS

☐ **SHOW GUIDE 13 Oct 1s**

☐ **SHOW REPORT 20 Oct 2s 6d**

☐ **SHOW REVIEW 27 Oct 1s**

Three superb special issues of THE AUTOCAR offer you the fullest, most authoritative coverage of Britain's top motoring event. In the Show Guide —what to see, where to see it, advance news, valuable Buyer's Guide tables. In the Show Report—vivid, illustrated stand-by-stand descriptions of the cars, coachwork, motorised caravans and interesting components. A magnificent issue. And in the Show Review—expert analysis of latest design trends, and full regular contents. *Many new models are described in each of these issues.*

The Autocar

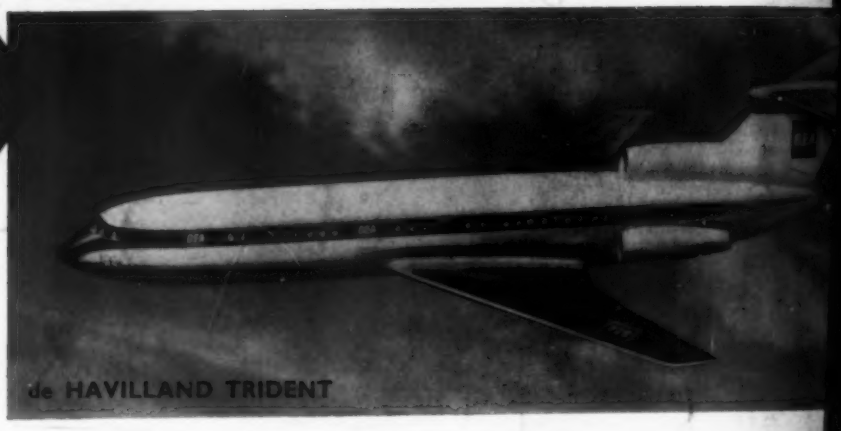
from all newsagents MAKE SURE OF YOUR COPY

MODERN AIRCRAFT DEPEND ON Lockheed EQUIPMENT

ONE OF THE
AUTOMOTIVE
PRODUCTS
GROUP

CIVIL AIRLINERS

such as the
VISCOUNT,
VANGUARD, V.C.10,
AVRO 748,
A. W. ARGOSY,
H.P. HERALD,
CARAVELLE,
COMET IV,
de H. TRIDENT, etc.


de HAVILLAND TRIDENT

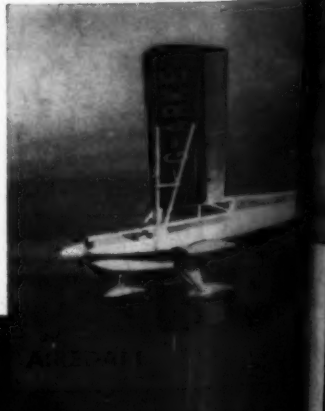
MILITARY

such as the
GNAT,
GNAT TRAINER,
SEA VIXEN,
JAVELIN,
BEVERLEY,
SAUNDERS ROE SCOUT,
AOP.9,
COMET II, etc.

FOLLAND GNAT TRAINER

de HAVILLAND SEA

EXECUTIVE

such as the
BEAGLE, B206,
AIREDALE,
HALCYON,
S.G.P. FLAMINGO.

BEAGLE
B.206